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AGRICULTURAL TECHNICAL ASSISTANCE
AND
PARTICIPANT TRAINING PROGRAM REPORT
FOR
1980

CONTRACT: AID/NE-C-1477
TA GRANT 150-0001

DATE: February 23, 1981

SUBMITTED BY: Dr. Donald E. McCreight
Project Leader
AID/IUA/URI Project
ICMRD
University of Rhode Island
Kingston, RI 02881

During a meeting late in 1979, officials from the University of the Azores, Regional Government of the Azores, University of Rhode Island, and United States Agency for International Development agreed upon the following technical assistance and participant training for the Agriculture component of the project.

Technical Assistance

Dr. Salomon, Soils Analysis, 1.5 months

February 1-23, 1980 - See Appendix 1 for report

March 11 - April 1981 - See Appendix 1 for projected scope of work

In addition to this technical assistance, IUA requested the services of Dr. Pollnac to provide further assistance with the sociocultural component of the project. A complete report of Dr. Pollnac's activities for the period of July 9-24, 1980 is included in Appendix 2 of this report.

Academic Participant Training

	<u>Beginning Date</u>	<u>Estimated Completion</u>	<u>Degree and Area of Specialization</u>
Joaquim Ponte Tavares University of Rhode Island	January 1978	December 1980	Ph.D. Food Science & Technology
Carlos Gradil University of Minnesota	April 1980	April 1982	M.S. Therigenology
Anabela Gomes University of Wisconsin	January 1981	January 1983	M.S. Forage Crops
Jorge Pinheiro University of Rhode Island	June or 1981	June 1983	M.S. Plant & Soil Science

Food Technology

In December 1980 Joaquim Ponte Tavares completed requirements for the Ph.D. degree in Food Science and Technology. In January 1981 Dr. Tavares returned to the University of the Azores charged with the responsibility of developing and implementing a university program in Food Technology. Dr. Tavares' dissertation research project involved the utilization of enzymes from the stomach of tuna fish to provide enzymes for cheese production. With his return to the University of the Azores, he should be a very valuable and productive staff member to implement the applied research, teaching, and extension functions related to Food Technology. A more detailed report of his research studies is included as Appendix 3 of this report.

Theriogenology (Animal Reproduction)

In April 1980 Carlos Gradil enrolled at the University of Minnesota in an M.S. program majoring in Theriogenology (Animal Reproduction). Currently Carlos has completed 16 credits during the spring and summer terms. He is currently enrolled for 2 credits. According to a recent report, Carlos plans to complete his studies on schedule by April of 1982. In Appendix 3 of this report a budget for Year 1, Year 2, and a description of his program is included.

Forage Crops

In January of 1981 Anabella Gomes, IUA staff member, enrolled in an M.S. program at the University of Wisconsin

to study Forage Crop Production. A projected budget is included in Appendix 3 of this report.

Plant and Soil Science

Jorge Pinheiro, IUA staff member, is accepted for an M.S. program at the University of Rhode Island in Plant and Soil Science. The starting date is established for June of 1980. A projected budget is included in Appendix 3 of this report.

Equipment

During 1980, equipment and supplies were requested by IUA in Terceira.

Soils

The following equipment and supplies were shipped to IUA for use in the soils analysis laboratory.

- 1 Sieve set, mechanical analysis of soils
- 1 Electrophotometer II 230V, 56/60 HZ
- 1 Shaker-Eberbach 50/60 HZ
- 1 Carrier Plate Shaker
- 1 Carrier for Shaker
- 1 Oven, gravity convection
- 1 Furnace, muffle
- 1 Thermolyne power input controller
- 2 Stirrers
- 2 Heating mantles (250) 230V
- 2 Wagon laboratories
- 1 Jar mill - roller 753RM
- 1 Accessory jar
- 2 Pumps - pressure vacuum
- 2 cs Hydrochloric acid reagent ACS
- 500 g Ammonium molybdate, crystal
- 1 cs Carbon-Darco G60 activated (500g)
- 1 kg Potassium chloride, crystal
- 500 g Calcium carbonate, powder
- 500 g Sodium chloride, crystal
- 1 kg Potassium dichromate, crystal
- 500 g Diphenylamine
- 500 g Ammonium vanadate, crystal
- 5 g O-phenanthroline
- 1 cs Sodium metaphosphate, powder (500 g)
- 1 kg Ferrous ammonium sulfate

In addition to these items of equipment and supplies, ten (10) six-unit packages of absorption cells for the electrophotometer II are on order and hopefully will be available to accompany Dr. Salomon in March.

Audiovisual Equipment

The following items of equipment were added during 1980 to the previous inventory of audiovisual equipment at IUA in Terceira.

- 1 Canon AE1 35mm camera
- 1 Canon FD F1.8 50mm standard lens
- 1 Kodak Ektagraphic slide projector AV340ZHK
- 1 Kodak Ektanar zoom lens, 4-6 in.

Food Technology

At the request of Eng^o Duarte Ponte, food technologist at IUA, the following items were ordered and shipped through the project to conduct applied research related to the canning of tuna.

- 3 Type "A" Direct immersion thermocouples
- 3 Type "B" Direct immersion thermocouples

Several books were also requested and obtained to assist other staff members in their consulting related to cheese making.

- Kosikowsk, Frank. "Cheese and Fermented Milk Foods." Cornell University, 1978. Second edition.
- Wilster, G. M. "Practical Cheese Making." Oregon State University Bookstore.

Additional Library Books and Journals

Four additional boxes of books and journals, including crop science and animal science journals, were collected and shipped to IUA during 1980.

APPENDIX I

SOILS ANALYSIS

CONSULTANT: Milton Salomon

HOME: RFD
Bradford, RI 02808

CONTRACT NO.: AID/NE-C-1477 150-001

CONTRACT FOR: Technical Consultants and Training

DATE: March 7, 1980

NOTE: In addition to normal administrative level distribution, it is recommended that the following people get copies:

- at IUA (Terceira) - Pinheiro, Faria, Lobo, Batista, Schmidt, and Leal
- in Serviços Agrícolas and Rural Extension - Cravão, Raquel da Silva, Duarte (Payal), and appropriate extension persons on the other islands.
- Mainland Portugal - J. Almeida Alves, Ministry of Agr.; Soveral Dias, Laboratorio Rebelo da Silva; Viera de Brito, Chimegal.

Under the contract, M. Salomon, soil consultant, identified areas that must be addressed in his assignment February 1-23, 1980. See itinerary on "Work to be Accomplished at IUA."

- A. Soil Testing
- B. Extension Services
- C. Soil Mapping
- D. Teaching
- E. Research

A. Soil Testing

Jorge Pinheiro, his well trained assistant Maria Matos, and I worked closely in refining and developing the methods to be used for soil testing in the laboratory. The double acid procedure is satisfactory and the staff (now in student laboratory) can proceed to test routinely at least 20 to 30 samples/day depending on the availability of sufficient glassware and chemicals. The measuring instruments are all in operation and functioning well--pH meters, spectrophotometer, and flame photometer.

Progress on construction of the regular soil test and research laboratories has been interrupted due to the earthquake. Excellent prefab benches have been received and once the damaged roof is repaired the work can proceed. Sets of blueprints based on our original sketches are on hand and in good order. I see no serious problems here if the IUA is able to supply construction people to get the work done. It will take close supervision by Pinheiro to make changes and adjustments as the work proceeds.

I find that Pinheiro has done an excellent job in training technicians and organizing the work. I was somewhat concerned that he will be leaving to do graduate work towards the end of the year. However, an Eng^o Agr. Sampaio, a pedologist presently at São Miguel, will be coming to join the soils group at Terceira. Pinheiro tells me that he (Sampaio) is well trained in soils and chemistry and can do the job of covering the soil test work. This means a well trained, continuing staff to carry on.

In my original reports I indicated concern about the correlation of our test methods with soils and crops in the Azores. At the time we recommended such studies so that we could establish the relationships between the tests and recommendations for fertilizer, manures, and lime to farmers via the extension services. To my satisfaction I was told that a broad farm survey was under way to establish a baseline of farm operations and conditions in the Azores. Essentially the survey will include about 300 farms and will measure crop production, animals, economics, management, etc. Also to be included is a sampling of soils and plants. This will make it possible to get a very large sample of soil test results that can be related (correlated) to practices and soil types. It will also make it possible to have a follow-up on selected sites after some changes in practices have been made. The soil testing can begin at once when samples come in.

In addition we have received the support of Eng^o Virgilio Leal to devise statistical models for field plot

techniques and design in future correlation studies on soils, crop varieties, and practices. Eng^o Batista, horticulturist, will also be involved in such experiments. I do sense a spirit of cooperation and enthusiasm between these two young scientists; and real live surveys and experiments should enhance this attitude.

Recommendations

1. Completion of soil test laboratory. The student laboratory is not well suited for routine testing. Under present low student enrollment it can be used to advantage, in fact, we have no alternative.
2. Build up supplies of standard glassware for routine testing--flasks, beakers, funnels, chemicals, filter paper, etc. There is a normal attrition of such items which must be anticipated.
3. A reasonable supply of spare parts and replacements must be kept on hand--electrodes, photocells, bulbs, etc. This is particularly important in the Azores where geography makes it difficult to get replacements quickly.
4. Continue to train technicians as backup for those leaving, etc.
5. Present excellent cooperation with Adelaide Lobo's chemistry work is important and must continue.
6. Construction of greenhouses (equipment now at Terceira) should be completed. Advise that people (?) on S^o Miguel who have had experience with such structures be called in to help. An Eng^o Camara (Terceira) has a background in controlled environmental studies could also be of

use here. Greenhouses could be very useful in the combination in soil tests--plant varieties and management practices under glass.

B. Extension Services

My contacts with Serviços Agrícolas and Rural Extension have been limited. Along with Jorge Pinheiro I did confer with A. Cravão and R. da Silva on Terceira. In the past I talked with Eng^o Agron. Duarte on Fayal, Fernandez on Pico, and people on São Miguel. Certainly their cooperation with the laboratories and other special services to be offered by the IUA is critical for a successful agricultural program.

During this assignment I got the impression that there was some interest in the islands in having separate soil testing laboratories. Evidently this concept is based on the belief that close-in testing would be more responsive to the needs of the particular island. There are many reasons why I oppose this idea:

1. The land area to be covered is very small--in the aggregate less than the state of Rhode Island. Population served, only about one-quarter.
2. The soils, with the possible exception of Santa Maria, are rather similar--acid, young, of volcanic origin, low in phosphorus.
3. A good soil test laboratory must be supervised by a trained soil chemist who is constantly checking to see that work is accurate and precise. Routine test laboratories are notorious for living with

3. errors where no one is checking operation and results. Very small laboratories can ill afford this expense nor can they give dependable results.
4. The creation of several laboratories probably using different analytical methods will result in different results and recommendations. This is a serious problem now in the United States and we have the opportunity early to avoid it in the Azores.
5. Varying results and recommendations tend to confuse farmers and the non-initiated in the intricacies of soil analysis. Soil testing and interpretation is more an art than an exact science.
6. Correlation studies must be made before a reliable service is established. For one central laboratory to do this will be enough of a problem.
7. Establishing a laboratory is expensive and we can ill afford to have duplication of expensive equipment, glassware, and chemicals in the Azores.
8. The shipping of soil samples to a central location should not be a serious handicap, and a workable system can be arranged to do this expeditiously.
9. Overall, a central laboratory will help develop a sense of unity in agricultural services for all the islands.

The viewpoints and rationale expressed above were supported by many people including A. Cravao, R. da Silva, J. Almeida Alves (Ministry of Agriculture, Lisbon), and

Director Soveral Dias, at Laboratorio Rebelo da Silva,
Topada da Ajuda, Lisbon.

These services have been in place and operating for a long time. I see no serious obstacles to close cooperation between the IUA, Serviços Agrícolas, and the newly-formed Rural Extension. My contacts in this area have been limited but my impressions are that a spirit of cooperation exists and everyone wants to see the new arrangement work.

I have some difficulty in understanding the place of the Serviços Agrícolas in relation to Rural Extension. No doubt they have different roles of which I am not aware. I sense, however, that there is wide overlap and perhaps that may be advantageous. I would hope, however, that this does not lead to difficulties and confusion.

The geographical reality of islands tends to isolate extension into small units, each catering to somewhat distinct populations, needs, and characteristics. This does have some merit but I believe it important that extension be treated as a whole with some unifying principles--not only for strength in dealing with farmers but in administrative matters with mainland agriculture and services.

Eng^o Faria has organized an extension program and workshop which will stress practical problems in soil management, fertilizers, and lime. He will be assisted by an agronomist from Portugal. As I understand it, the meetings will be held at Terceira sometime late this spring.

The 300 farm survey mentioned previously should serve to bring the IUA and extension services closer together.

Cooperation has been promised in this undertaking.

Recommendations

1. The IUA should become the center for help in organizing workshops and training sessions for the extension services.

2. Specialists at the IUA should assist field services wherever required--programs, soil testing, diagnosis of plant disorders, animals, insects, and disease.

3. Cooperate with the extension people in the publication and distribution of practical educational materials.

4. Basically, the IUA must become visible to the people in the Azores as an ongoing, important asset to the islands.

5. Wherever possible the extension staff should encourage Azorian students to consider attending the IUA for their continuing education. Field days at the IUA, young people events, and other orientation programs are possibilities.

C. Soil Mapping

Since my last visit, this plan has been reconsidered and will not be attempted until a later time. There may be many reasons for this but I believe cost of such a survey may have proved prohibitive, especially when considered in relation to other pressing needs.

Although I believe that reliable soil maps would be an asset, the services can operate with present knowledge (some maps are available) and with analytical results from the

soil test laboratory and with crops and soil people presently on the staff.

Recommendations

1. Locate and organize any and all soil information-- maps, analytical results, and observations that may be available in the Azores, in Europe, and elsewhere that relate to the soils and agriculture of the Azores. These should be placed on file in the library at the IUA as soon as possible.

2. Formal, permanent records be kept of all soil and plant analyses determined in the IUA laboratories. Such records can be a storehouse of information for future investigations and mapping.

D. Teaching

This area is somewhat difficult to measure due to the the small number of students in the Agricultural Sciences. The courses in basic soils, soil fertility, and pedology are well organized on paper. In the past I have been satisfied with lectures and laboratories as presented by Eng^o Faria and Pinheiro.

During this visit I spent some time observing a laboratory class in biochemistry--Adelaide Lobo, instructor. I was very much impressed with the excellent orientation and instructions given to a class of 6 to 7. The laboratory materials were beautifully laid out and organized. During the actual experimentation Eng^o Lobo and/or her assistant were available, helpful, and attentive to questions. I would

rate her instruction as first class.

Pinheiro and I have suggested that student help be used for collecting samples in the farm survey. This will depend on funds and interest by students.

The overriding problem in the teaching area is lack of students. Somehow the IUA at Terceira must come to grips with this. I don't think it enough to wait for Lisbon to supply bodies. Something must be devised to sell the concept of an Azorian University to the Azorians. I realize this to be a complicated problem but, regardless, it is of such critical importance that our best efforts should be directed towards this goal.

E. Research

As in the past I have little to say in this area. Research needs, I believe, will evolve as the staff gets acquainted with practical problems. For instance, Eng^o Batista presents a good example of this approach. He feels that deciduous fruit varieties (apples, pears, and peaches) are of poor quality in the Azores. He is quite convinced that it is a matter of short dormancy periods related to moderate, year-round temperatures. To improve quality, he is engaged in a search for varieties that do well with short dormant periods. Evidently such varieties have been developed in Israel, Utah, and elsewhere. This is an example of adaptive research which is possible early in the development of an agricultural experiment station.

No doubt other ideas will be emerging with time and observations. It will be mostly a matter of identifying

problems and devising approaches for their solution. I believe the staff at the IUA will handle such situations well.

Recommendations

A conscious effort should be made by the staff and administration to identify areas for research. These areas should be openly discussed and priorities for research should be agreed upon. Certainly, suggestions from the extension people must also be considered.

LIST OF SUGGESTED ACTIVITIES FOR M. SALOMON
ON 3-WEEK CONSULTING ASSIGNMENT TO IUA (1981)

March 11 - April 1, 1981

1. Refinement of soil test laboratory - troubleshoot methods, sampling techniques, workflow of samples from farmers, record keeping, recommendations and overall operation of this service.
2. Help establish and reinforce connection between IUA technical assistance with Serviços de Agricultura and Lavoura Açoriana. Visits to other islands to consult with staff should be included.
3. Identify possible soil research areas - Cooperation with other staff at IUA - horticulture, animal sciences, chemistry. Special attentions to Azorean region.
4. Review responsibility of soils laboratory to soil mapping (cartography). Survey of the 300 farms to be part of this review.
5. Teaching situation: Laboratory and lectures.
6. Check on training of replacement for Jorge Pinheiro (U.S.A.-2 yrs.) and also on lab technicians.

APPENDIX II

SOCIOCULTURAL PARAMETERS

REPORT OF AZORES CONSULTANCY -

JULY 9, 1980 TO JULY 24, 1980

DR. RICHARD B. POLLNAC

PREPARED: August 1980

CONSULTANT: DR. RICHARD B. POLLNAC

COMPONENT NO. 4 Sociocultural Parameters

PHASE V: Follow-up on collection and analysis of data from S. Miguel

INTRODUCTION The purpose of this phase of the project was to: (1) provide consultation and assistance where necessary in the final data collection and compilation stages on S. Miguel; (2) consult with University of the Azores social scientists concerning progress of research projects initiated by the first phase of the project.

ITINERARY

9 July Depart U.S.A.

10 - 11 July Consultant arrives at the University of the Azores and consults with Dr. Carmo concerning on-going data collection and coding. A review of data collected and coded thus far was conducted.

12 July Consultant and Dr. Carmo travel to Maia, S. Miguel to meet with the Parish Priest to arrange for the parish priest to announce the up-coming interviews which are to take place at the end of July.

14 - 23 July Further consultations with Dr. Carmo concerning the Project. The consultant and Dr. Carmo conduct abbreviated coding of survey material collected from a 15% random sample of farmer and fishermen family heads drawn from a representative sample of nine rural communities on S. Miguel (Ribeira Grande; Ribeira Cha; S. Pedro, Villa Franca; Varzea, Ginetes; Fazenda, Nordeste; Furnas; Calhotas; Pico da Pedra; Rabo da Piexe). Consultation and coding was also accomplished on data collected from a

universe of 53 rural parish priests which will form part of a study concerning the role of the parish priest in rural development on S. Miguel. Further consultation with University of the Azores social science personnel concerning their role in development work was also conducted.

24 July

Consultant returns to U.S.A.

SPECIFIC ACCOMPLISHMENTS

- (1) The data collected by University of the Azores personnel was reviewed and found to be in fairly good condition. The sampling procedure used (15% random sample of farming and fishing household heads from a representative sample of 10 rural villages on S. Miguel) was found to be adequate. Sample sizes from some of the smaller communities were too small to generalize back to the community level, but they are satisfactory when combined with samples from other communities to generalize to S. Miguel.
- (2) Coding was proceeding slowly because of a lack of personnel. The Consultant and Dr. Carmo coded a subset of the data to speed-up the analysis. This coding gave Dr. Carmo hands-on experience in coding a large amount of data; thus improving his ability to supervise coders. In addition it provided the consultant and Dr. Carmo with data which will be written-up in the coming months.
- (3) The consultant's assistance with the study concerning the role of the parish priest in development further enhanced Dr. Carmo's

ability to work with survey data; thus increasing his value as a resource person for further applied work in the Azores which requires a social science input. Further, the study of the priests will help us understand the important role they have played in social change in the azores.

ATTITUDES TOWARD COOPERATION AMONG SMALL-SCALE FISHERMEN AND FARMERS IN THE AZORES

RICHARD B. POLLNAC

University of Rhode Island

and

FRANCISCO CARMO

Instituto Universitario dos Acores

Many governments, international organizations, and individuals view the fishermen's cooperative as the ideal means of improving small-scale fisheries. Nevertheless, the success of fishermen's cooperatives has been mixed, with some successes and many failures. These failures, in contrast to reported successes among small-scale farmers, have led some to suggest that certain aspects of the occupation of fishing militate against cooperation. This paper compares attitudes toward cooperation and participation in organizations among small-scale fishermen and farmers in the Azores. Variance in attitudes toward cooperation and participation in organizations is examined in terms of other sociocultural variables.

Many governments, international organizations, and individuals view the fishermen's cooperative as the ideal means of improving small-scale fisheries. In some cases marked success has been reported (FAO 1971) and in others, failure (UNRISD 1975). The successes have led many governmental and international aid organizations to make release of development funds contingent upon formation of fishermen's cooperatives for management purposes. This has led to increased pressure with regard to attempts to institute cooperative organizations. In many instances these attempts have been abortive either the fishermen resisted organization or the cooperatives failed soon after formation. These failures, in contrast to successful farmers cooperatives, have led to suggestions that various aspects of the occupation of fishing militate against cooperation in the fisheries (cf. Digby 1973).

Digby (1973) argues that in many societies fishermen have very low status, and that this low social standing tends to make them unreceptive to the cooperative movement as a consequence of their suspicious attitude toward outsiders and their advice.

He also suggests that while farmers are settled and have a tradition of mutual aid at harvest, fishermen tend to lead a semi-nomadic life, are hard to locate, and are quite uncooperative outside the sphere of necessary collaboration within a single crew.

Numerous researchers have noted that fishermen can be characterized as "independent" types (cf. Pollnac and Ruiz-Stout 1977a, Poggie and Gersuny 1974, Harrison 1970; Aronoff 1967; Kottak 1966). This relative independence on the part of fishermen has been related to environmental and technological constraints of the occupation of fishing (cf. Poggie 1979, Pollnac 1976). Poggie (1979) suggests that this psychological trait of independence is a factor involved in the lack of success of fishermen's cooperatives.

Although it is tempting to make the claim that there is some intrinsic aspect of the occupation of fishing that results in fishermen being less likely than agriculturalists to cooperate, we must remember that there are successful fishermen's cooperatives (cf. Poggie 1979, Pollnac 1978, 1977, Digby 1973, F.A.O. 1971)

as well as unsuccessful agricultural cooperatives (cf. Digby 1973; Inayatullah 1972; Borda 1971). Some of the explanations provided to account for the failure of fishermen's cooperatives could apply equally well to agricultural cooperatives (cf. Pollnac 1978; Digby 1973). Additionally, in some instances fishermen's cooperatives have failed because the model used was that of an agricultural cooperative, and aspects of the occupation of fishing conflicted with some of its structural features (cf. Pollnac 1978). Finally, as Digby (1973) points out, fisheries form only a small part of the economy in many countries; thus, their relative unimportance in comparison with agriculture has led to less emphasis and inconsistent cooperative development.

Therefore, the belief that fishermen are somehow predisposed to reject the idea of cooperation because of attitudes, beliefs, and values intrinsically associated with their occupation is an inadequate explanation by itself of the relative success and failure of fishermen's cooperatives. Perhaps some of these intrinsic aspects of the occupation contribute somewhat to the variance in relative success, but the literature cited above suggests that numerous factors are involved. Determining the relative importance and interactions between the various causal factors is an empirical question that can only be answered by intensive research.

The purpose of this paper is to provide a modest contribution to this necessary research by examining differences and similarities in attitudes and behavioral intentions regarding cooperation, *as well as* participation in organizations among small-scale fishermen and farmers in the Portuguese Atlantic Islands of the Azores. The relationships between these ideational and behavioral aspects of cooperation and other sociocultural variables (e.g., age, education, exposure to mass media, material well being, etc.) will be examined in an attempt to separate out important factors involved. An understanding of these relationships in the Azores, which cannot be claimed to be

representative of all areas where cooperative development is planned, will nevertheless aid in understanding problems associated with development in the region; in addition, it provides another case example which may stimulate further research and improve our understanding of the socio-cultural factors related to cooperative success and failure.

Population and Sample: The Azores form part of Portugal's Atlantic Islands and are located approximately 930 miles from Europe and 2400 miles from North America. The nine islands extend for a distance of about 390 miles. The smallest island is Corvo (17 Km²) with a population estimated at 355, and the largest is San Miguel (757 Km²) with approximately 137,300 inhabitants in 1975. In all, the nine islands have approximately 260,000 inhabitants, most of whom are either farmers or fishermen. Population pressure has led to a great deal of fragmentation of land holdings and out-migration over the years, with most of the emigrants going either to the United States or to Canada. Recently, a yearly average of over 10,000 emigrants have gone from the Azores to North America (White and Pollnac 1979).

The sample for this study was drawn from two villages in the northern part of San Miguel. A fifteen percent random sample of fisherman and farmer household heads was drawn from Rabo de Peixe and Pico da Pedra. Rabo de Peixe is a fishing and farming village located on the northern shore of San Miguel. Pico da Pedra is a small farming community approximately 3 kilometers from Rabo de Peixe and 2 kilometers inland. The total sample was composed of 49 fishermen and 34 farmers.

Rabo de Peixe manifests one of the largest concentrations of fishermen on San Miguel. Most of the fishermen live in one area of the town, immediately adjacent to the coast. The separation between the fishermen and farmers is quite marked. It was reported that in the recent past they even sat in different sections of the church

during mass. Today, the fishermen of Rabo de Peixe are considered to be among the poorest inhabitants of the island and most in need of assistance. They fish from open boats ranging in size from about 12 to 40 feet in length. The larger vessels are powered primarily by inboard diesel engines and the smaller by gasoline outboards. Fishermen on the bigger vessels use hand-hauled nets; thus, their crew size is relatively large, ranging from six to 16. The smaller vessels get along with two to five crew members. Most of the crews include kinsmen.

For the most part, the farmers of Rabo de Peixe and Pico da Pedra own relatively small scale holdings which are quite fragmented. Approximately half own cattle, and nearly all keep small animals such as pigs and chickens. Less than one-fourth of these farmers use power equipment such as tractors and tillers. Various fruits and vegetables are grown for the local market. Fruits associated with more tropical areas, such as bananas and oranges, are grown on relatively small plots of land surrounded by dense plantings of hedge which create a favorable microclimate. These plantings contribute even more to the impression of small, fragmentary land holdings.

Tests: As a means of testing Digby's assertion that fishermen are suspicious towards outsiders and their advice, fishermen and farmers were presented with the statement "never confide in a stranger" and asked if they agreed totally, in part, or disagreed. Attitudes toward cooperation were determined on the basis of (1) whether or not the respondent said he would be willing to cooperate in the ownership of productive equipment and (2) how he responded to the assertion that it is preferable to earn less and be the owner of the land than earn more and divide ownership. Fishermen and farmers who were unwilling to state that they would cooperate with others were asked for reasons why, and their responses were recorded and content analysed. Those who said they were willing to cooperate were asked if they could find others who

would cooperate. If they responded that they could not, they were asked why, and these responses were recorded and content analysed. They were also asked who they would prefer to cooperate with: relatives, non-relatives, or both. The behavioral measure of cooperation was actual membership in a fishermen's or farmer's association.

Independent variables such as occupation, age, education, correspondence with relatives abroad, ownership of productive equipment, and income were determined from responses to direct questions. Due to problems involved in obtaining exact information concerning income, individuals were requested to place themselves into one of five general income categories, and these categories were used as the income measure. Mass media exposure was determined with the use of a scale composed of the sum of relative exposure to newspapers, magazines, radio, television, and cinema. If the respondent was never exposed to the medium in question he would receive a score of zero; if only occasionally during the year, a score of one; once or twice a month, a score of two; once or twice a week, a score of three; and a score of four if exposed every day. Summed scores for all media were ranged in a scale with a potential of zero to 20. Item total correlations for this scale ranged from 0.39 to 0.74 ($p < .01$). Cosmopolitanism or exposure to the outside world, was measured by determining if the respondent had travelled outside his home island. Finally, material style of life was measured by assigning a score of one for each of the following items present in the home: (1) running water, (2) toilet, (3) electricity, (4) sewing machine, (5) refrigerator, (6) washing machine, (7) television, (8) radio, (9) telephone. The scores were ranged in a scale with a potential of zero to 9.

Analysis: Table 1 includes the sample distribution of the variables included in this study. The relationship between fisherman or farmer status and suspicions towards outsiders can be found in Table 2.

Table 2 indicates that fishermen and farmers do not respond in a significantly different manner to the statement "never confide in a stranger," suggesting that these Azorian fishermen are no more suspicious of strangers than are farmers.

Relationships between other cooperation variables and fisherman-farmer status, as well as other independent variables, can be found in Table 3. In the analysis presented here, independent variables were dichotomized at the sample mean where appropriate, and Kendall's Tau was calculated as a measure of association. Chi Square was used as the test of significance.

The analysis of Table 3 indicates that none of the cooperation variables are significantly associated with fisherman-farmer status. Furthermore, very few of the other sociocultural variables are related to the measures. We find that education is only related to fisherman/farmer association membership. The direction of the relationship indicates that those who are more educated are less likely to join. Ownership of productive equipment is positively related to agreement with the statement that it is preferable to earn less and own the land than earn more and share ownership. Finally, exposure to mass media is positively associated with a willingness to cooperate with others.

Turning to reasons provided for a lack of willingness to cooperate, we find that the responses could be sub-categorized into three categories: (1) a negative attitude towards sharing, (2) a prediction of fighting or other discord, and (3) a category composed of idiosyncratic responses such as "too old for that," "what I grow is too little," etc. Thirty eight percent of the 47 respondents to this question manifest a negative attitude towards sharing, 19 percent predict discord, and 43 percent provide idiosyncratic responses. The categorized responses (excluding the idiosyncratic category) were cross tabulated with a selection of the independent variables, and the results can be found in Table 4.

There are only two significant relationships in Table 4. Looking at the data (Phi does not indicate the direction of the relationship), we find that younger men (those with the mean age or less) are more likely to predict discord than older men (32 versus 5 percent respectively). We also find that those with more than the mean number of years of education are more likely to predict discord than those with less (35 versus 10 percent respectively). None of the other independent variables are significantly related to these response categories.

With respect to the question concerning preferred cooperation partners, 24 percent said that they would prefer to cooperate with relatives only, 21 percent with non-relatives, and 55 percent with both relatives and non-relatives. Finally, 61 percent of the 33 respondents who evidenced a positive attitude towards cooperation said that it would be difficult to find others to cooperate with. The rationales provided were similar to those reported above for negative attitudes toward cooperation. Forty percent provided responses that reflected that they thought others had negative attitudes toward sharing; 20 percent predicted that others would cause discord; and 40 percent gave idiosyncratic responses. Due to the fact that this was the last in a series of conditional questions (e.g., if "yes" to question "X" then proceed to question "Y"), cell sizes became so small that no statistical tests were conducted. The distribution of responses is provided as a means of elaborating the descriptive account of attitudes toward cooperation within the sample.

Discussion: Overall, the data indicate a relatively negative attitude toward cooperation within the sample. Only 11 percent belong to fishermen's or farmer's associations, 77 percent would prefer to earn less and own the land than earn more and share ownership, and only 40 percent assert that they would cooperate with others in the ownership of productive equipment. Primary among the reasons given for lack of

cooperation are responses that can be categorized as a lack of willingness to share; e.g., "to each his own," "what I gain is for me," "what is mine is mine." Of secondary importance was the belief that such cooperation would lead to discord; e.g., "there will be disagreements," "we will end up fighting." Even among the 40 percent who said that they would agree to cooperate, fully 61 percent predicted that they could not find others to cooperate with. The reasons projected concerning those who would fail to cooperate were similar to those given for a negative attitude toward cooperation—lack of willingness to share on the part of others and a prediction of discord.

These findings are supported by the literature concerning sociocultural impediments to cooperative development. For example, Inayatullah (1972) writes that an important factor to be considered in the establishment of cooperative activities is the quality and degree of interpersonal trust. The degree of suspicion present within the sample is clearly demonstrated by the fact that 75 percent of the respondents fully agreed (*concordo totalmente*) with the statement "never trust a stranger." Foster (1973) notes that this attitude is quite common in peasant societies. Furthermore, in an area where there is a great deal of population pressure on land and other resources such as in the Azores, there is little question that an image of limited good develops (cf. Foster 1965). The idea of "limited good" refers to the belief that all goods are allotted in a specific amount which cannot be increased but only redistributed. This belief is contrary to the ideal that through cooperatives the total amount of goods can be increased (cf. Inayatullah 1972; Carroll 1969); hence, the relatively negative attitude towards cooperation among the fishermen and farmers in our sample. Moreover, most of the fishermen and farmers in the sample are quite marginal economically. A mistake in planning their productive activities could result in financial disaster; thus, the perceived risk

of any changes would be relatively high. Since there is a significant amount of lack of trust in combination with an image of limited good, the risks of cooperation would be perceived to be relatively high. Experimental analyses of cooperative behavior have indicated that one of the strongest predictors of withdrawal of cooperation is degree of risk (Marwell and Schmitt 1975).

Central to the questions posed by this paper is the fact that we find no differences between fishermen and farmers with respect to cooperation. Perhaps this is due to the fact that the degree of perceived pressure on resources, interpersonal distrust, and perceived risks is similar for both sectors of the population sampled. The only statistically significant findings were that those with more education are less likely to belong to fishermen's or farmer's associations, exposure to mass media is positively related to willingness to cooperate, and owners of productive equipment are less likely to agree that sharing and earning more is preferable to sole ownership and less income. A possible explanation for the first finding is that those with more education probably perceive less of a need for membership in the existing organizations. The relationship between mass media exposure and willingness to cooperate is similar to findings by Pollnac and Ruiz-Stout (1977b) who report that newspaper reading is directly related to knowledge about fishermen's cooperatives which has a significant effect on cooperative membership. Finally, those who do not already own productive equipment are probably more likely to declare that they would like to share ownership since this can only increase their present good.

In sum, the findings of this paper suggest that the relative lack of trust within the sample is probably partially responsible for the tendency to have a negative attitude towards cooperation. This relative lack of trust, in combination with population pressure on resources which results in an image

of limited good, influences the degree of perceived risk concerning changes, thus further suppressing any tendencies toward cooperative behavior. It is suggested that programs designed to increase the quantity and quality of interpersonal communication in rural regions of this island economy may increase trust and reduce perceived risk (cf. Marwell and Schmitt 1975). Such

programs, in combination with others designed to counter the image of limited good by demonstrating that increased goods can accompany cooperative behavior, may succeed in increasing the likelihood of successful cooperative movements which will facilitate development of these Azorian small-scale farmers and fishermen.

TABLES

Table 1. Sample Distribution of Dependent and Independent Variables.

1. Age (mean years)	46.7
2. Formal Education (mean years)	1.3
3. Travel Outside Home Island (%)	53
4. Correspond with relatives abroad (%)	67
5. Income Scale (mode)	2*
6. Own productive equipment (%)	48
7. Maternal Style of Life Scale (\bar{X})	4.4
8. Mass Media Exposure Scale (\bar{X})	6.2
9. Belong to association (%)	11
10. Positive attitude toward cooperation (%)	40
11. Percent who agree that it is better to earn less and own land than earn more and share	77

N = 83 *12 - 24 thousand escudos per year.

Table 2. Cross-tabulations of fisherman-farmer status and response to assertion "never confide in a stranger."

	FISHERMAN	FARMER
Agree totally	36	26
Agree in part	9	5
Disagree	4	3

$\chi^2 = 0.19$ $p > .10$

Table 3. Correlations between Cooperation Variables and Independent Variables.

	<u>ASSOCIATION MEMBER</u>	<u>WILLING TO COOPERATE</u>	<u>PREFER TO¹ EARN LESS</u>
1. Fisherman-farmer status	-.13	-.13	.16
2. Age ²	.03	-.05	-.07
3. Education ²	-.28*	.12	.14
4. Travel outside home island	.02	-.02	.00
5. Correspond with relative abroad	.08	-.01	.05
6. Income ²	.10	-.08	-.07
7. Own productive equipment	-.03	-.09	.24*
8. Material Style of Life ²	-.13	-.03	-.07
9. Mass Media Exposure ²	.14	.22*	-.06

¹ agree with assertion "prefer to earn less and own land than earn more and share."

² dichotomized at sample mean * = $p < .05$ N = 83

Table 4. Relationships between categorized reasons for negative attitude toward cooperation and selected independent variables.

	<u>NEGATIVE TOWARD SHARING</u>		<u>PREDICT DISCORD</u>	
	<u>X²</u>	<u>Phi</u>	<u>X²</u>	<u>Phi</u>
1. Age ¹	0.07	.04	5.70*	.35
2. Education ¹	0.89	.14	4.48*	.31
3. Correspond with relative abroad	0.00	.00	0.18	.06
4. Income ¹	2.13	.21	0.02	.02
5. Own productive equipment	0.90	.14	1.76	.19
6. Fisherman-farmer status	0.14	.05	0.81	.13

¹ dichotomized at sample mean. * = $p < .05$

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APPENDIX III

PARTICIPANT TRAINING

ESTIMATED COSTS FOR ACADEMIC PARTICIPANT CARLOS GRADIL

M.S. Candidate in Theriogenology at the
University of Minnesota, Minneapolis

Year 1 - March 24, 1980 to March 24, 1981

Maintenance Allowance

First 30 days @ \$45	\$ 1,350
Next 11 months @ \$455 per month	5,005
* Tuition and Fees	
Spring 1980	825
Summer 1980	825
Fall 1980	950
Winter 1980	950
** Equipment	
2 ob sleeves, 2 coveralls, pair of boots and calculator	300
Compulsory insurance for participant	300
Society membership	100
Attendance at professional meetings	700
Airfare - Providence to Minneapolis and airport to campus	200
Book allowance for 12 months @ \$35 per month	420
	<hr/>
Estimated Total	\$11,925

* Tuition is calculated on the basis of 8 credit hours per term and assumes a 15% inflation factor in calculating the fall and winter term

** This required equipment was identified by the major advisor Dr. Raimunds Zemjanis of the University of Minnesota

INFORMATION - PARTICIPANT CARLOS GRADIL

Courses Completed

Spring 1980

Course	Credits	Grade
ANSC 5324 - SEMEN PRESERVATION AND ARTIFICIAL INSEMINATION	(5)	B
LACS 5550 - DIAGNOSTIC OBSTETRICS IN THERIOGENOLOGY	(2)	B
LACS 5533 - REPRODUCTIVE DISEASES OF DAIRY CATTLE	(2)	A
- - SEMINAR	(1)	(S-N)

Summer 1980

Course	Credits	Grade
LACS 8590 - ADVANCE DIAGNOSTIC METHODS	(3)	A
LACS 8594 - SPECIAL PROBLEMS IN AN. REPRODUCTION	(2)	A
LACS 5572 - REP. PATTERNS AND INFERTILITY IN DOG AND CAT	(1)	A

Current Enrollment

Course	Credits	Grade
LACS 8594 - SPECIAL PROBLEMS IN AN. REPRODUCTION	(3)	.
ANSC 5321 - PHYSIOLOGY OF REPRODUCTION	(5)	
LACS 5185 - SWINE HERD HEALTH MANAGEMENT	(2)	
LACS 5552 - VETERINARY OBSTETRICS LABORATORY	(1)	

Seminars and Professional Meetings Attended (Other than those at the University of Minnesota)

April 1980 - Present (List meeting and expense)

Annual meeting of the Society for Theriogenology - 9/10-12/80
(Omaha - Nebraska)

November 1980 - Completion of M.S. (List projected meetings and estimate of cost)

{ Annual meeting of the Society for Theriogenology
{ air fair - \$288,00 dl)

{ Annual meeting of Animal Science
{ air fair - \$368,00 dl)

{ Annual meeting of the American Veterinary Medical Association
{ air fair - \$210,00 dl)

- Consider 2-3d for each meeting!

Have you encountered any specific problems? If so, please identify them!

By the contrary. The only problem concerns strictly with my familiar situation that you are aware of. Can you discuss this problem with the Azorean people. Certainly my performance would be better. I'll sure appreciate your attention in this catp.

Please return to: (By November 10, 1980 or sooner)

Dr. Donald E. McCreight
304 Rodman Hall
University of Rhode Island
Kingston, RI 02881

ESTIMATED COSTS FOR ACADEMIC PARTICIPANT ANABELA GOMES
M.S. CANDIDATE IN AGRONOMY/FORAGE CROPS
UNIVERSITY OF WISCONSIN - MADISON
JANUARY 9, 1981 TO JANUARY 9, 1983

Maintenance		
First 30 days @ \$50		\$ 1,500
Remaining 23 months \$505 @ 3 months		1,515
\$576 @ 20 months		11,520
Tuition and Fees		
Spring 1981		2,064
Summer 1981		967
Fall 1981 Estimate		2,375
Spring 1982 Estimate		2,375
Summer 1982 Estimate		1,115
Fall 1982 Estimate		2,375
Equipment \$300/year		600
Compulsory Insurance for Participant \$350/year		700
Attendance at Professional Meetings \$750/year		1,500
Airfare - Providence-Madison and Return		450
Book Allowance for 24 months @ \$35 per month		840
Typing of Major Papers \$125/year		250
Society Membership and Journal Subscription		200
ICMRD Administrative Fee July 1, 1981-December 31, 1982		
10% of \$21,895		2,190

GRAND TOTAL		\$32,536

ESTIMATED COSTS FOR ACADEMIC PARTICIPANT
JORGE PINHEIRO
M.S. CANDIDATE IN PLANT AND SOIL SCIENCE
AT THE UNIVERSITY OF RHODE ISLAND

June 1, 1981 to May 31, 1983

Maintenance Allowance

First 30 days @ \$50	\$ 1,500
Next 8 months @ \$505	4,040
Last 15 months @ \$580	8,700

Book Allowance

24 months @ \$25	840
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Equipment Allowance

2 years @ \$300/year	600
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Tuition and Fees

Spring 1981	1,128
Summer 1981	1,050
Fall 1981	1,300
Spring 1982	1,300
Summer 1982	1,150
Fall 1982	1,495

Compulsory Insurance @ \$350/year	700
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Attendance at Professional Meetings \$750/year	1,500
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Typing of Major Papers \$250/year	250
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Society Membership and Journal Subscription	200
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ICHRD Administrative Fee July 1, 1981-December 31, 1982 10% of \$20,000	2,000
--	-------

\$27,753

Haste makes waste experimentation fruitful at URI

by JACQUELINE McGRATH

Some day beer, cheese products, cake mixes and detergents may be improved or less expensive, or both, because of current research being done on seafood waste at the University of Rhode Island.

Food scientists at URI's College of Resource Development have come up with a way to recover protein-rich material from fish and shellfish waste and at the same time reduce industrial pollution in Rhode Island waters, a breakthrough that could benefit the consumer and seafood industry alike.

In one research project, enzymes from clam bellies are being used to improve beer filtration and soften the texture of cake mixes. In another area, enzymes from tuna stomachs are being tested to coagulate milk for cheese manufacturing. Scientists are also developing a waste treatment process for using shellfish waste in soaps and detergents.

The researchers who recover the proteins and digestive enzymes of surf clams from a concentrated clam belly rinse water say the proteins could be used in soaps and detergents while enzymes may be used to improve beer filtration and soften the texture of baked goods by breaking down the starch in the fermentable sugars used in them. The clam waste concentrate can even be converted to septic tank additives, or fish feed and fertilizer.

Professor A.G. Rand, Jr., and his graduate assistant Philip Pivarnik actually "fish out" the enzymes from the rinse water by a process called ion exchange, which selectively removes these materials so that they can be concentrated and recovered.

The clam waste water they use comes from a seafood processing plant located a few miles from the university. There, the meat of surf clams, which measure four to six inches in diameter, is separated and the belly contents are squeezed out and homogenized. The meat continues on through regular processing. But the water that is used in the separation process is recycled and the belly contents are continually accumulated in it for about four hours until there is a concentration effect.

main source of this product. But in the past decade, as the price of a gallon of rennet from calves has climbed from \$10 to \$50, alternate sources are being developed here and abroad.

Using rennet from the stomachs of hogs and adult cows and from microbial sources has reduced the cost of the product to food manufacturers here in the United States by about 50 percent.

It's Dr. Rand's belief, however, that rennet from tuna intestines may cut even that cost in half.

At the present time, though, tuna stomachs are being thrown away at most processing plants. The supply Dr. Rand works with comes from the Van Camp Company in San Diego, a nationally-known food manufacturing firm interested enough in his research to collect, freeze, package and ship the tuna stomachs to him air freight and free of charge.

The URI investigator and his associate, Ponte Tavares, a Ph.D candidate from the Azores, receives 50 to 100 tuna stomachs in each shipment. Mr. Tavares defrosts them, puts them through a meat grinder and mixes them with an extracting solution which draws the milk-coagulating enzyme out of the tissue. The extract then goes through cleanup and isolation steps to make it acceptable for food use.

Right now, Dr. Rand observes, the extract does not seem to possess the wide range of acidity needed to make it a satisfactory coagulant. The researcher believes, however, that in the near future URI scientists will be able to modify its properties and make it more acceptable for cheese manufacturing.

He notes that in the Azores, where there is great potential for food processing, Azoreans are trying to improve their own cheese industry. Local production of an alternate rennet source make the Azores less dependent on foreign supplies, while creating more jobs for these people.

Dr. Rand, Mr. Tavares and Mr. Pivarnik often confer with Stanley Barnett, a Sea Grant researcher who has a joint appointment as a chemical engineer and as a food technologist at URI.

Dr. Barnett, developed a method that allows seafood wastes to clean themselves. One of the products of the shellfish waste treatment process is foam. The foam is then added to industrial waste to attract contaminants in discharge streams, and by doing so, retrieves materials that could be used in the manufacture of detergents.

Dr. Barnett's foam features several pluses. It is inexpensive compared to traditional waste treatment processes. It doesn't break down during pumping. And it can be dried and stored for future use.

A major American soap manufacturer would like him to channel all of his research energies into producing one large, purified sample of the foam so company chemists can screen it. But the URI scientist has put them on hold until the clean up of industrial metals effluents in the state can be accomplished.

This month, because of renewed Sea Grant funding, Dr. Barnett steps into the role of principal investigator in a broadened cooperative investigation of potential uses for recovered seafood wastes.

"We've already gone to the federal well to survey the agricultural waste situation in the tropical and subtropical world. Now we want to apply what we've learned to seafood processing here in Rhode Island," says Dr. Barnett.

Several seafood processing plants throughout the state will take part in the expanded effort to explore the hidden benefits in shellfish waste.

The research team will include Dr. Rand, Philip Pivarnik and URI experts in aquaculture and biochemistry. Together they may recycle an old bromide to read "Want not want? Waste not waste."

For approximately two weeks, the waste water is contained in vats in the backyard of the processing plant and aerated to allow bacteria to work on it for eventual discharge with other plant sewage.

On any given day, in the rear of the processing plant, Pivarnik can be spotted filling empty gallon jugs with the waste rinse. Then it's back to the lab to recover quickly the enzymes and other proteins. Presently, he is working with small batches of it at a time, a quantity he is trying to scale up for commercial application.

Since clam wastes spoil quickly, haste makes waste experimentation more fruitful. "In 24 hours at room temperature, clam wastes become putrid," says Pivarnik. "Under refrigeration, they will keep about a week to ten days," he adds.

Although clam waste research has been conducted at URI for four years, the approach that Pivarnik and his mentor, Dr. Rand, are taking has been going for only a year.

"For three years," Dr. Rand says, "we looked at just the crystalline style (part of the clam belly) of the surf clam, which has to be separated by hand. We are limiting our studies to those specific enzymes in the higher concentration of enzymes in the whole digestive tract, we could deal more directly with pollution problems that exist in the seafood processing industry."

Dr. Rand's work with seafood waste is not restricted to clams. Some of his research is done with tuna intestines, particularly the digestive enzymes in tuna stomachs, that may provide a cheap source of the rennet used in coagulating milk for cheese manufacturing.

Rennet is an extract of the fourth stomach of an unweaned animal. Traditionally, young calves were the



"FISHING OUT" THE ENZYMES IN SEAFOOD WASTE: Food scientists Ponte Tavares and A.G. Rand, Jr. look over a batch of seafood waste that is going through an enzyme recovery process. Their research, funded by Sea Grant, is part of an overall ex-

periment station project to salvage from clam and tuna wastes materials that will be useful in environmental cleanup and in improving certain manufactured goods.

Photo by David Perrotta

The university is trying to fill a near-vacuum in education

JOAQUIM PONTE TAVARES, a candidate for a doctorate in food technology at the University of Rhode Island in Kingston, is one of many Azoreans studying in the United States. Unlike most of them, he is not an immigrant. He intends to return to the Azores to use his education.

"In the United States, we're going to have one million Azoreans and their descendants," Ponte said, referring to the entire history of immigration from the islands. "In the Azores, the population now is about 250,000," he said, about the same as a century ago.

"We can't continue to live in isolation" in the Azores, he said. "We have to create conditions of life that are similar to those found here" by diversifying the economy to capitalize on the islands' agricultural and marine resources.

About 45 percent of the population works in agriculture, largely by hand, using traditional methods passed on for generations from father to son.

Ponte and others like him are concerned that the average Azorean won't benefit from economic development unless he has the skills to step into an expanded job market. "It's important to prepare a population that wants to continue in school," he said.

Ponte, an educator as well as an agronomist, was part of an installation commission that opened the University of the Azores in 1976, the first institution of higher learning in the history of the archipelago.

Jose Enes, rector of the university, said its instruction and research programs are designed to create the expertise needed to promote the islands' development.

The university has an oceanography and fisheries department in Faial, an agricultural sciences department in Terceira, and a main campus in Sao Miguel.

While Terceira was hit the hardest by the New Year's Day earthquake which struck the Azores this year, reports from those who recently visited that island indicate that the university's agricultural sciences department sustained very little damage.

The university is trying to fill a near-vacuum in education. Its largest program, in Sao Miguel, is designed to train more secondary school teachers so all Azorean youngsters will have a chance to make it past the sixth grade. Before the university opened, the nearest course for high school teachers was in Lisbon, about 900 miles away.

Last spring, the university had about 300 students in the teaching program, 45 in agricultural sciences and 90 in business administration.

The University of Rhode Island provides some technical aid and training services for the agriculture and fisheries programs at the new university, financed by the U.S. Agency for International Development.

Some of URI's most important work in the Azores is helping the the new university train rural extension agents who will staff a program patterned on extension services run by URI and other land grant colleges in the United States, said the URI project co-directors, Donald E. McCreight and John Sainsbury.

Gourlay Young Amaral, director of the Azorean university's agricultural sciences department in Terceira, said extension agents will provide information to encourage farmers to diversify their crops and increase their yields.

The Azores in previous centuries had a variety of exports, including wheat and fruit, Amaral said, but emigration drained the labor force and farmers concentrated increasingly on raising beef for the continent. The moderate temperatures and rich soil of the Azores allow cattle to graze year-round at elevations below 300 meters.

The training of extension agents began last spring and will continue several more months. In July and August they will study in the United States, McCreight said.

One of the agents' most important tools is expected to be a study being made by the Azorean university with the help of URI anthropologist Richard Pollnac on farming and fishing communities' attitudes toward modernization.

The study will help predict what kinds of social and cultural obstacles extension agents might encounter, Pollnac said. He and Francisco Carmo, the Azorean professor who is directing the study, have already found some evidence that farmers and fishermen are wary of cooperating with others to increase productivity, at least in Sao Miguel.

Of a total sample of 49 fishermen and 34 farmers in Rabo de Peixe and another nearby village, Pico da Pedra, "77 percent would prefer to earn less and own the land rather than earn more and share ownership," the paper said.

"Only 11 percent belonged to fishermen's or farmers' associations ... and only 40 percent assert that they would



A UNIVERSITY of the Azores staff member with soil samples.



DONALD McCREIGHT, co-director of URI's Azorean assistance program.

cooperate with others in the ownership of productive equipment." Pollnac and Carmo said. Of those who said they would cooperate, 61 percent didn't believe they could find others who felt the same way, the paper said.

Pollnac and Carmo said their research suggests the prevailing attitude stems from a lack of mutual trust and the idea of "limited good," which develops in areas like the Azores where there aren't enough land and other resources to go around.

The idea of "limited good" is the "belief that all goods are allotted in a specific amount which cannot be increased but only redistributed," the paper said, a notion contrary to the ideal that cooperatives can increase the total amount of goods, or profits.

Pollnac and Carmo suggested that programs intended to improve farmers' and fishermen's personal contact with one another in their respective professions might increase trust.

URI consultants are also helping the University of the Azores develop specialized classroom instruction and applied research programs.

Biochemist Milton Solomon, retired chairman of URI's food and resource chemistry department, designed the benches and supervised the selection of equipment in the first soil testing lab in the department of agricultural sciences in Angra do Heroismo, the principal city on the island of Terceira.

That lab is being used by undergraduates, and a second lab was being planned for testing of farmers' soil samples.

Solomon did "one-to-one teaching" with two university staff members to develop a soils course, said McCreight.

One of the two men Solomon tutored will pursue an advanced university degree in soils in the United States later this year, McCreight said. The project has also provided the staff of the University of the Azores with specialized

training in the United States in internships lasting from three weeks to three months.

Other project consultants work with instructors individually on various topics covering marine life and animal and vegetable crop production in much the same way that Solomon worked on soils.

MCreight, an extension education specialist, said he is careful to choose consultants who emphasize a practical application of their respective fields.

"A lot of people at the university level want a theoretical education, not the practical, and they really need the practical here," McCreight said.

"When we go out, I talk to the fishermen," said Sainsbury, a marine biologist. "If a boat needs pulling up, I will help them." It's Sainsbury's way of conveying the message that a professor's status and education do not mean that he can't do things in the field.

The traditional attitude has been that the "people out there don't know what they need," Sainsbury said, alluding to the great distance between the peasant class and the educated elite of island society.

"Everything has been one way there until now," he said, from the top of society downward. "Nothing was going two ways," Sainsbury said.

Portuguese and other European universities have an image as Ph.D. factories which emphasize theoretical education at the expense of practical professional training, Enes said, adding that such ideas circulate long after reality changes.

Amaral noted that the University of the Azores has an experimental farm on Terceira. Such a thing wouldn't exist in a classic university, he said. □