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EVALUATION

OF

SMALL FARM PRODUCTION SYSTEMS PROJECT

CATIE-ROCAP

Project No. 596-0083

Centro Interamericano de
Documentación e Información
Agrícola

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CIDIA
Turrialba, Costa Rica

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EXPERIENCE INCORPORATED

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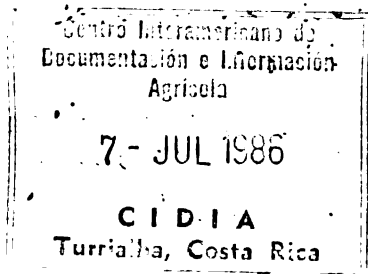
INTRODUCTION

This evaluation was conducted in September, 1982 by a 4-man team provided by Experience, Inc. The Project itself was begun on April 1, 1979 with an anticipated life of 4 1/2 years. Together with another project entitled "Agricultural Research and Information System", this project builds upon the experience of the previous Small Farm Cropping Systems Project (596-0064) between CATIE and ROCAP.

The Project has been beset by serious and unforeseen constraints which have nullified several of the assumptions made during the design of the project. Chief among the impediments has been the civil insurgency in many areas of Central America, resulting in (1) major changes in governmental organization; (2) pre-emption of resources of the participating governments; and (3) abandonment of on-going and planned activity sites with military domination shifts.

It is to the credit of the Project implementers that a fair amount of continuity has been maintained and that most of the outputs may be realized before its presently planned completion date of September 30, 1983.

A description of the Small Farm Production Systems Project appears in Annex 1 of the appended Project Agreement.



RECOMMENDATIONS

GENERAL RECOMMENDATIONS

That
- The Small Farmer Production Systems Project ~~should~~ be extended for
four years beyond its original termination date, ~~to~~ September
30, 1983, dependent upon the continued support and financing of the
contributing agencies.

That
- CATIE ~~must~~ immediately incorporate a strong Extension and Communi-
cations element into the overall Project to better assure the utili-
zation of the Project's findings.

SPECIFIC RECOMMENDATIONS

- THAT CAREFUL ATTENTION AND THOUGHT BE
GIVEN TO A BETTER DEFINITION OF
THE MINIMUM DATA REQUIREMENTS TO
ACHIEVE PROJECT OBJECTIVES.

- THAT ECONOMIC FEASIBILITY STUDIES BE
DEVELOPED FOR THE LIVESTOCK "MODULOS"
FOR THE PURPOSE OF ^{SHOWING} IF AND HOW
CAPITAL INVESTMENTS MIGHT BE
AMORTIZED.

- That consideration be given to commencing mixed systems methodology
research on those farms where ^{livestock} "modulos" have already been established.

SPECIFIC RECOMMENDATIONS, CONTINUED

- THAT DATA COLLECTED FOR EXTRAPOLATION TRIALS ~~BE~~ BE REVIEWED TO ELIMINATE INFORMATION THAT MAY BE HIGHLY CORRELATED TO SOIL TEXTURE SUCH AS SOIL WATER HOLDING CAPACITY AND DRAINAGE.
- THAT FUTURE ALTERNATIVE CROPPING SYSTEMS TRIALS ^{INCLUDE} ADDITIONAL COMPLETE ~~EXPERIENCE~~ FACTORIAL FERTILIZER EXPERIMENTS TO DETERMINE CROP(S) RESPONSIVENESS TO NITROGEN, PHOSPHATE AND POTASSIUM.

A. Assess the effectiveness of organizational and administrative structure of CATIE and national institutions for carrying out multi-disciplinary research on crop/animal/mixed farming systems.

CATIE has been very effective in carrying out multi-disciplinary research on crops and animals but not mixed systems. The organizational and administrative structure is excellent. The personnel at the Central office in Turrialba have had a great deal of experience in their scientific field and are good administrators. The field technicians have been well trained and they have a very good knowledge of Spanish which is necessary for working with the farmers, national scientists and extension personnel.

CATIE has produced observable results thus far, both at its Turrialba headquarters and in each of the 6 countries in which the Project is operating. It should come close to developing the intended outputs despite obstacles of considerable proportions beyond the control of the Project (military action, governmental changes, lack of anticipated national support in some countries, abandoning of some Project activity areas). Additionally, CATIE itself suffered a financial trauma about two years ago, and some changes in plans were necessitated by an interruption in anticipated funding from ROCAP. The evaluators feel that CATIE has complied satisfactorily although organizational and administrative linkages are not clearly delineated.

It should be mentioned that there are very few Universities, Institutions or commercial companies that have expertise in multi-disciplinary research.

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NATIONAL INSTITUTIONS vary extremely among the six participating countries, due largely to internal upheavals. Factors affecting this variability include a) human and fiscal resources available, b) attitude toward external involvement and c) stability of present agricultural support institutions. One must hope and assume that the negative factors will disappear as political stability returns to the region.

In the interim, the activities of CATIE in this Project have provided vital linkages which have helped to preserve the matrix of agricultural research and extension in the region.

- B. Evaluate if the regional approach has been effective in stimulating national interest and improving national capability in farming systems research/outreach and if it has measurably enhanced cooperation and collaboration between national and regional entities.

The regional approach has been very effective in stimulating national interest and improving national capability in farming systems research. It was difficult in the beginning to obtain the cooperation of some of the Central American countries in signing a regional project. After four years of work, the research and extension personnel in all of the countries are very happy that the program was initiated.. The cooperation between national and regional entities. If the CATIE project had not been started in Honduras, the farmers would have lost at least two years of research information due to low budgets for research and extension. As a result of the low budgets, funds were not available to pay for staff, vehicles, spare parts and fuel.

Research staff in several of the other countries have concentrated their research on experimental stations because funds were not available for fuel for their vehicles, so that adapted research could not be done on the farmer's farm. Certain types of research must be done at the farm level if it is going to provide the farmer with a realistic package of improved practices.

Interest in the Project at national levels has been enhanced in all six countries although not all have been able to participate to the same degree. Where participation has been most evident, there is active concurrence of research in conducting trials on farmers' land and incorporating the systems approach. Improvement in a country's

capability in such research is difficult to measure after only two years of exposure to the Project but all of the Ministry and research officers encountered expressed optimism about the Project's approach and a desire to expand the activity within the country. The degree of cooperation between each country and CATIE varied on the positive side, but there was little evident linkage in research between countries.

Presumably, CATIE will disseminate the analysis of the Project systems results when they are available. As of this date, however, there seems to be very little exchange of information across national borders, even among CATIE's own Project technicians. A monthly or bi-monthly house organ could serve to integrate the Project participants and permit the sharing of experiences. Such opportunities are presently extremely infrequent although each field station does keep the

CATIE headquarters informed about its activities. CATIE, through this Project, is in a position to promote the exchange of research and extension information among the six countries.

C. Determine whether the project has demonstrated promise/potential for favorably influencing production and productivity of food crops, animals and combinations of crops and animals.

The evaluators visited more than 30 farm sites, most of which were in the verification stage of a cropping alternative. The farmers involved were, without exception, convinced that the practices were beneficial and that they intended to follow them in the future (unless credit would be a limiting factor). Neighbors, who were not directly involved, also expressed interest in a limited trial on their own land.

The research data has shown an economic return on many of the treatments used in the alternative trials. More work will be needed on the mixed system.

Where the system involved livestock, results of a total system approach could not be as spectacularly quantified after only one-year of farmer involvement. It is doubtful that equal enthusiasm can be generated by the end of the Project due to the greater complexity of the system of alternatives, ^(and the time involved) in dealing with livestock (cattle and pigs).

An apparent weakness in the Project is the lack of specific plans to promote the extension of its systems improvement on a larger scale. Eventually, about 30 farmers will be directly associated with the validation of each alternative trial in each country, but the Project

expects to complete the final validation process with only about 200 farmers by the end of 1983.

This project was apparently conceived as a determined effort to provide close linkage between research and the farmer. The approach has already made commendable strides in this direction. Research specialists are addressing the problems of the small farmer in multi-cultivo and mixed crops and livestock systems. Baseline studies of the farm and home enterprise have given researchers a far better understanding of the intricacies involved in changing any single practice. Researchers have moved their trials from the "laboratory" to the farmer's land, and the farmer is participating in the application of the alternative methodology trials. Certainly, the gap of communication has been narrowed substantially.

With the ultimate goal within reach, it is deplorable that the Project does not foresee a concerted effort to multiply and disseminate the validated results through the local Extension Services. At the present stage, the cost of the Project per contacted farmer has been very high, -- and this is anticipated in a pilot operation. Nonetheless, if positive results are obtained, the Project and the national Extension Services should capitalize on them, and on the entire new approach. This offers an opportunity, not only to close the gap between research and farmers, but to assess the value of this approach in comparison with traditional methods of Extension.

D. Examine if the quality and quantity of research can be evaluated as to cost-effectiveness relative to prevailing economic conditions, salaries and benefits within the region.

Cost effectiveness evaluation of on-going agricultural research and institution building activities is an undeveloped area of inquiry. Ruttan, in some of his most recent writings, addresses this question. He outlines the many issues involved but suggests only fairly broad, general approaches and suggestions to policy/decision makers. Given present knowledge of the process, only insights into the "efficiency" issues can be obtained. The interpretation of these insights is quite subjective.

Succinctly, the efficiency issue is: At less cost can identical results be achieved over an identical time period by re-arranging and/or re-combining resources available to a research project? It is this question that is examined here.

A basis for examining the efficiency question is to compare relative proportions of the different budget line items of a given project to those of other "successful" projects. Further insight is obtained by then analyzing in detail, per unit expenditure, magnitudes within given line items. For most AID funded projects, the latter analysis entails giving primary attention to project salary levels. Per unit costs of other projects inputs, e.g., vehicles, participant training and etc. tend to be constants across projects.

For the SFPS Project, ROCAP-sourced obligations by line item through 1982 and the reprogrammed budget for the entire project period (as

of May 1982) are shown in the following table. Percentages of the total by line item are also shown.

SFPS BUDGET BY LINE ITEM AID/ROCAP SOURCED
(In 1,000 U.S.\$)

<u>ITEM</u>	<u>Total OBL Thru 1982</u>	<u>% of total</u>	<u>Repro- grammed Budget</u>	<u>% of total</u>
Professional Staff	2345	40.1	3027.7	40.9
Non-professional Staff	715	12.2	989.7	13.4
Commodities	325	5.5	330.3	4.5
Travel and Per Diem	490	8.3	639.4	8.6
Training	75	1.2	119.5	1.6
Other Costs: Scientific	1000	17.1	1366.5	18.5
Mgt: CATIE	435	7.4	435.0	5.9
Mgt. ROCAP	200	3.4	200.0	2.7
Contingencies	270	4.6	294.9	4.0

Of the ten line items, two--professional and non-professional salaries--comprise the largest percentage of the budget, some 52 to 54 percent. This figure is quite modest compared to the same coefficient of U.S. Land Grant Universities, International Research Centers and AID funded bilateral research projects. Salaries as a percentage of total research costs are now typically in the range of 75 to 85 percent or more for U.S. Land Grant Institutions, around 70 to 75 percent for International Research Centers and 60 to 70 percent for AID-funded

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bilateral projects. National Research Programs in the region typically expend 90 percent or more of total budgets for salaries.

Clearly, the SFPS project cannot be directly compared to other research programs. However, SFPS project expenditures for professional and non-professional salaries as a percentage of the total budget are considerably lower than those for other research programs. Considering only professional salaries, the SFPS percentage is markedly below other programs.

This gross comparison implies that the SFPS project is relatively "understaffed" compared to other programs. Therefore, in terms of the efficiency cost-effectiveness criteria, the SFPS Project would appear to rate quite high.

The apparent high "efficiency" rating of the project occurs in spite of relatively high salary and benefit compensation levels of project professional. Compensation levels are roughly equivalent to those of the International Research Centers and resident AID contract employees, somewhat higher (on a net basis) than U.S. Land Grant resident faculty, and sharply higher than typical publicly employed professionals in the region.

Compensation levels alone are highly misleading comparative measures. Virtually, all of the SFPS project staff are contracted for a two-

year period. They enjoy no tenure ^{or} ~~no~~ long term job security. Opportunities for "after hours" consulting and similar income-producing activities commonly practiced by the region's publicly employed professionals are precluded.

Relatively high CATIE compensation levels are thus a tradeoff for job insecurity and foregone income from other sources. Present international market conditions for professional agricultural researchers might permit entrance hirings at levels below those now paid. However, any momentary improvement in the market would likely result in resignation of personnel employed at such levels.

The evaluation team view is that present professional compensation levels are consistent and in line with the quality of personnel employed and the employment conditions CATIE can offer under contract projects. Current market conditions imply that entrance compensation levels could perhaps be lower. However, the impact of attempting to economize on professional compensation would prejudice the longer term quality and quantity of the research, and be counterproductive to the project's institution building objectives.

Given that CATIE derives funding from 48 different sources, the use of a consistent compensation policy for all of its professional personnel across all contracts is a basic requirement. The evaluation team

view is that CATIE's compensation policy is and should remain as an internal CATIE matter.

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If the Project conceives that past research has been ineffectual because it has not considered the entire farming system, then the same rational should be applied to systematizing all factors in the Research-Training-Extension-Farmer linkage. The possibilities are further explored in another section of this report.

The quality and quantity of research has been good in most all of the countries in Central America except for the mixed system. Some of the trials in Honduras could be improved if four or five replication had been used instead of three. The irrigation methods on some farms in Honduras could be improved ~~on~~ for vegetable crops but in most of the other countries the quality of research has been excellent.

The research has been cost-effective relative to prevailing economic conditions, salaries and benefits to the region. The validation trials in Panamá indicate that it is easy to double the yield of rice by using improved varieties, economic fertilizer applications and herbicides.

The quality of research could be improved in some countries by establishing complete factorial designs of N, P, K plus an additional treatment for minor elements. Some of the scientists indicated that it was not possible to establish complete factorial experiments because only complete formulas of fertilizer were available in several countries. If this is the case, CATIE should import urea, triple superphosphate and potassium of chloride as well as minor elements for these trials. *in the countries where it is not available.*

Dr. Ronald Stricker has conducted complete factorial trials in Honduras and has found that high levels of potassium on several soils give an antagonistic effect for magnesium that results in a decrease in yield.

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Many of the grain crops in Central America do not show a response to potassium or some soils; therefore, the farmer may be wasting his money on buying potassium in a complete formula when he does not need potassium.

Some farmer^s may even be reducing their yield by applying an excess amount of potassium ^{which results in a deficiency of} ~~due a reduction of~~ magnesium.

The fertilizer companies will change the type of fertilizer they sell ^{in a country} if enough scientists can prove that potassium is not needed in certain areas on grain crops. The farmers might be better off applying diammonia phosphate and ^{urea} cerea ~~for~~ grain crops.

Zinc is deficient in corn on some soils and magnesium and sulfur are needed on some soils. A treatment of minor elements along with a complete factorial design may show up other deficiencies in the future.

~~Aluminum~~ ^{may be} ~~toxic~~ ^{toxic} on some soils and the soils should be analyzed to

↑
Aluminum may be toxic on some soils, and the soil should be analyzed to check the level of aluminum in the soil.

analyzed to

E. Assess the effectiveness of analyzing, storing, disseminating and application of research results.

CATIE headquarters this year, received an up-to-date set of IBM data processing and storage equipment with four terminals. This represents a quantum improvement over its previous facilities.

Information received from each of the research/plots and farmer validation plots is processed and stored at Turrialba for subsequent analysis by project technicians, and, where practicable, by nationals of the country where the data ^{were} ~~was~~ collected. In-service training in data processing and analysis is also provided. It is anticipated that new facilities will appreciably accelerate the analysis. Results are to be used in selecting additional farming system alternatives and in the extrapolation process. The processing and storage capabilities at CATIE should no longer be a constraint in analysis of field trials, nor in the availability of this information to professionals involved in the activities.

The data from the experimental trials are analyzed by a computer and stored on discs or tapes. The analysis is good ^{but only 20% of the data} and an economic analysis ^{has been on some} ~~is made in most~~ of the trials. *has been analyzed*

It might be desirable to collect different data for the extrapolation trials. At the present time, the following factors are being programmed in the computer: slope of the land, water holding capacity of the soil, drainage, soil texture, nitrogen, phosphate and rainfall. An analysis should be made to determine if water holding capacity of

the soil and drainage are correlated to soil texture. If there is a significant correlation, they could be deleted and data recorded only on the percent of sand, clay and silt.

In the case of the chemical analysis it would be desirable to analysis the soil ^{aluminium,} for potassium, magnesium, sulphur, zinc and organic matter. Most soil analysis include organic matter but ~~do~~ not nitrogen so by including organic matter as well as nitrogen, the regression coefficients will be more valuable in the future. Many of the soils in Central America are volcanic in origin and high in potassium. Excess application^s of potassium added to the soil when it is not necessary results in an antagonism effect that reduces the available magnesium. It would be desirable to include potassium and magnesium in the correlation studies. Several soils in Central America are deficient in zinc and sulfur so it would also be desirable to include them in the extrapolation program. Aluminium is toxic in many soils in Central America *and should be included in the analysis.*

The application of research results ^{and validation trials} is not sufficient to reach the majority of the farmers. CATIE needs to develop flip books and video tapes on the validation trials as visual aids to train the extension personnel in each country.

F. Evaluate whether the project has contributed to the long-term improvement of CATIE's research capability in farming systems; to the long-term viability of CATIE and to the continuity of farming systems research within the region.

CATIE's capability to do research in farming systems is undoubtedly improved over the short-term. The increase in number of highly qualified personnel was dictated by the Project needs. The experience being acquired by the research ~~staff~~ ^{and} administrative ~~staff~~ ^{staffs in} carrying out the research adds to the capability in ^{the} qualitative sense. Hence, over the short-term, research ^{capability is improved} quantitatively and qualitatively. The physical facilities, laboratory, buildings, etc. have improved and a particularly noteworthy improvement is the new library building now under construction and financed by Great Britain. The library has implications for the long-term.

How much?

Concurrently with the ROCAP/CATIE project, CATIE has attracted support from a number of international donors and informal support from other international research agencies. CATIE has matured into a respected institution and it could actually be called the leader among them with reference to the quantity of research on-going in farmer systems.

The long-term viability of CATIE has some negative aspects. Too much of its financing ^{is} ~~is~~ from short-term project sources. As projects ~~come~~ ^{end} go, CATIE, tends to expand and contract ~~the~~ ^{the in a} accordion effect. Contracted personnel may come and go, taking with them experience difficult to replace. Many research personnel have no tenure, being

How many staff?

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of two years at a time.

contracted for ~~short~~ periods. They have no tenure and thus tend to demand higher compensation. From the aspect of continuity there is a problem. While the type of financing is not likely to ~~be a~~ ^{defeat} ~~so-~~ ^{absolutely} ~~the~~ ^{the} CATIE's long-term viability, and ~~to~~ ^{the} continuity of farming research, one cannot help hoping that ultimately more financing --budget support-- not dominated by project linkages may be forthcoming. A foundation with international interests in research ^{and ex} could be of great assistance to CATIE long-term viability and to small farmer oriented research.

Apart from CATIE's role in farming systems research, the cooperating countries can and some surely will, ~~we~~ play a role. They endorse this type of research and presently all are involved in it. They are, however, ^{as} already pointed out elsewhere in this evaluation, subject to some negative forces which are not easily predicted.

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G. Identify any lessons learned that should be applied to improve future development efforts.

One lesson learned from the project is the effect of a regional program in countries close to each other that are politically unstable. By using a regional approach to helping small farmers, it is possible to work in "Island of Opportunity": if one area becomes political unsafe to work in, the program can be changed rapidly to another area in a short time. If the project had consisted of six national projects it might ^{have} had been necessary to cancel the program in some countries. When the USAID pulls out of a country and later returns, many years of data are lost due to the fact that it usually takes two years or more from the time a project is in the conception stage until the conditions precedent are met. The small farmers tend to lose valuable information due to short period of political government stability. The lesson learned in this case is that regional programs have merit under conditions of government instability. There is also a considerable saving in the cost of designing a regional project, as well as the cost of evaluation and implementation. ~~the cost of~~ ^{cost of 6 national projects}

The evaluation team also conferred with CATIE on what lessons it might have learned. CATIE constructed "future development efforts" to pertain to development through future project development, design and operations. CATIE observations follow:

1. Cooperating countries are prone to expect more financial support than CATIE can provide. If the project plan calls for initiation of the project in all countries at the same time, this tends to

throw an overload on the CATIE personnel. A time-phased ^{beam} arranged with the countries would be better.

2. The counterpart contribution, estimated at the moment a project paper is written, is subject to much change as changing leadership in the countries shifts priorities and resources. Thus, the counterpart ^{needs} needs to be under constant review.
3. The counterpart contribution which CATIE requests, should be more realistic as regards the cooperating institutions. The best procedure would be to start at a level at which gradual increases would be possible during the life of the project.
4. It is probably better to introduce some of the activities of a new project on a demonstration basis to show the cooperating country authorities the merits of the project before going to the higher officials, such as a Minister, to negotiate a Convenio, ^{agreement}.
5. Careful study of the relation between the objectives of a project and the duration of the same is indicated.
6. Careful analysis of the type of product or of actions requested of a contractor would be of value.
7. The quantification of outputs should be ^{realistic} more flexible because the ~~assumptions made at the time of writing the Project Paper can~~ change significantly.

The remaining lessons had to do with project management, coordinator internally and with AID PROJECT MANAGEMENT. They were summarized as follows, although they deal with future development only indirectly and with reference to future project. The team would recommend ^{that} ROCAP note and follow-up with a joint critique with CATIE in those matters which affect both.

The designation of a senior advisor ^{in learning systems} is considered advisable; he would be a recognized authority in the investigation of systems of production who can visit CATIE periodically. ^{the function of the subordinate coordinators to be principally of technical nature}
 To avoid proliferation of coordinators into the administrative organization of a project, it would be desirable for the function of the coordinators to be principally of technical nature.

The acquisition of equipment and vehicles through a purchasing agent which AID recommended ^{turned} out to be more expensive than it would have had the purchasing been done by CATIE directly.

Salary?

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- H. Evaluate methodologies and procedures used by the integrated research and technical teams at CATIE as applied to site selection, experimental design, selection basis for research treatment used in experiments, experiment execution, monitoring, data collection, processing, analysis and dissemination.

LIVESTOCK

The Project Agreement calls for the development by CATIE of specific criteria for area selection in each country. This has been accomplished. * ~~Development, Testing and Transfer of Prototypes of Cattle Production. CATIE, Department of Animal Production. Mimeo. August, 1982.~~

The main criteria considered in the selection of research areas are:

- 1) National priority
- 2) Potential for improvement, biological and economic
- 3) Concentration of small producers
- 4) Tradition of cattle production
- 5) Presence of national institutions
- 6) Presence of infrastructure

Moreover, the areas chosen are representative of ^{five} important ecological zones. For example, very dry, tropical: Olanchito, Honduras; very humid, tropical: Guápiles, Costa Rica and La Ceiba, Honduras.

The total number of target areas chosen was 15 in the 6 countries.

Of the 6 criteria for area selection listed above, numbers 2, 3, and 4 were studied by means of questionnaires which generated a substantial amount of data on local problems, practices, and what the producer considered to be his problems.

* Development TESTING and Transfer of Prototypes of Cattle Production. CATIE Dept of Animal

By the end of this project (0083) CATIE will be able to produce a document with good information on the methodology for selecting an area for on-farm research and data-gathering.

As required by the Project Agreement, CATIE will be able to produce for a given target area a data summary and technological recommendations. It ~~is~~^{is} unlikely, however, that this document can be produced country-by-country in the form of a participating country document. CATIE will have to produce the document, but some of the countries (Panamá, Guatemala and Honduras are possibilities) may give considerable assistance.

In the course of developing methodology for on-the-farm research with animals it is necessary to test and prove the methodology by the soundness of the technology which came about. The methodology is the product, but the technology is the reason for the methodology. The ultimate beneficiary is the small farmer identified by the Project, but he is not the beneficiary directly. What the Project does not provide is the actual transfer of technology to the small farmer; it does propose to develop research methods and/or research for effect-ing the transfer to the small farmer through the transfer agents of participating countries.

Quantity and Quality of On-Farm Animal Research

One familiar with ^{the} Central American scene will appreciate what confronts CATIE and participating countries in the planning and execution of animal and forage-pasture experiments on small farms. The target areas are ^{often} rather remote and the almost impassable country roads require the technicians to spend a high proportion of their work day in uncomfortable travel. The travel is expensive due to excessive stress on the vehicles and consumption of fuel. Much of the vehicle mileage is in the lower gears. The time required for travel to make visits reduces the number of on-farm studies that can be carried out.

A considerable proportion of the earlier efforts consisted of surveys out of which area studies were developed from the survey data. For example, the initial diagnostic study of an area in Guatemala, Nueva Concepción, was based on data gathered from 66 farms.

After the study of the larger sample of farms, from which the area could be described in such terms as average size of farm, number of cattle per farm, type of cattle operation (e.g. dual-purpose) etc., more intensive studies were made on a smaller number of "typical" farms. Certain ones would be studied for a short period of time; others over longer period^s so that information could be obtained on the changes taking place (the farm dynamics) and the decision being made by the farmer. The studies develop baseline information. These stu-

dies are not what one usually associates with livestock research. They are more in the camp of the farm management specialist and/or the rural sociologist. Yet, such studies can be valuable for orienting or focusing livestock research and further economic studies.

On some farms visited, 4 in Honduras and 4 in Guatemala, módulos were established. Typically, the farmer's pastures were planted to an improved pasture grass, such as African Star Grass; the pastures would be fenced and cross-fenced, resulting in a number of plots for rotational grazing; a milking stable with concrete floor, a roof, ^{and} stanchions for restraining cows during milking were constructed; molasses and urea were made available in special feeders; salt and mineral were provided; some módulos might have trench silos and sugar cane or Napier grass plots for dry season forage.

^{Resident}
~~Resident~~ CATIE people and their counterparts were following the módulos closely, recording herd inventory changes, milk production sales, cost of inputs, man-hours of labor, etc. Again this is research which falls into the realm of agricultural economics research, although the data may be recorded by livestock technicians. Most of the animal husbandry practices introduced into the módulo are technology transfers; the research has already been done and the módulo tests how the farmer responds to the package. (It was a little surprising to learn that the Nueva Concepción area of Guatemala, 75 percent of the farms already had improved pastures and 45% practice ^{to}

tational grazing. Eighty six (86) percent provided salt for their cattle, 86 percent provided mineral, 33 percent molasses and 92% crop residues. The practice of vaccination and treatment of parasites are routine on 87 percent of farms studied. ~~Development, Testing and Transfer of Prototypes of Cattle Production. CATIE Department of Animal Production, Mimeo. August, 1982.~~

Besides the módulos developed in Nueva Concepción, CATIE and the participating countries designed improved módulos for La Ceiba, Olanchito and Comayagua in Honduras; Matagalpa in Nicaragua; Monteverde and Cariari in Costa Rica and Bugaba in Panamá. The valuation team visited three módulos in Nueva Concepción, three in Comayagua and one in Cariari. The módulos are being tested under conditions of the producer.

The above-mentioned CATIE document gives details of herd performance in three situations in Nueva Concepción: (1) model managed by investigators, (2) model managed by the farmer, (3) traditional system of one local producer of net income, net income per man-day and net return on investment were made. The returns on the módulos were superior.

The team endorses this type of economic study and recommends that it ^b be expanded to include additional studies, such as would support a farmer's request for credit if he were preparing to finance the installation of the módulo. Two important studies needed: (1) ana-

* Development, Testing and Transfer of Prototypes of Cattle Production. CATIE Dept of Animal Production, Mimeo, Aug. 1982



lysis and projections year by year of herd composition based on projected births, deaths, cullings, sex of animals, milk produced for sale, off-take of animals; (2) cash flow projection by years. Examples of these types of studies can be found in annexes of the loan papers for livestock projects of the World Bank.

These projections ^{would} ~~would~~ give a good appraisal of the farmer's ability to amortize a loan for establishing a módulo (or some portion of it). Here is an opportunity to lay some ground work for future small farmer loan program for financing under international bank loan projects.

In general sense, livestock technology is more transferable than plant technology. It is not as site-sensitive. Good milking practice is good anywhere. Treatments for cattle ticks and tórsalo are routine in all areas. But there are certain problems in Central America and Panamá which call for some testing. The deficiency in protein for all classes of livestock is a severe constraint. The total feed supply (protein and other nutrients) is another, more particularly in those areas which have the annual dry season. It is pleasing to note that the search for protein is being emphasized by CATIE and colleagues in their forage research. For example, Leucaena, a legume, is being tested in several location as a higher protein forage. It is gratifying and even suprising to find as much investigation as appeared for this evaluation. The program of investigation for 1982

is documented and will not be repeated here. It is noted that the experiments are designed for studies in pastures and forage crops, nutrition and animal health in 6 countries. Quantified in more detail, there are 10 studies in Panamá, 16 in Costa Rica, 9 in Nicaragua, 4 in El Salvador, 19 in Honduras and 11 in Guatemala. Most of these are on-farm studies. ^{*} ~~Memoria, 3rd Meeting for Animal Production Programming. CATIE, Department of Animal Production, 1981~~

RP
ID

In addition, there are approximately 40 studies going on in Turrialba. The studies are well oriented toward solutions to the priority problems of dry season feeding, sources of home-grown protein and improving pasture quality and yield, and some work has been started with small animals (sheep, goats, swine and poultry). ^{RP} The work with small animals focuses on nutrition and system of management, i.e. confinement vs. more freedom ^{of} movement. Swine and poultry are widely held by traditional small farmers. The animals are managed largely as scavenger operations. Both of these species search out some of their animal protein requirements when they have freedom to move in the neighborhood. When confined, they do very poorly unless their protein, energy and other nutrient requirements are met. Hence at CATIE, work focuses realistically on how the nutrients are to be supplied. Panamá has a law that prevents the sale of swine for human consumption of ~~the~~ animals ~~were~~ not confined to pens. Sheep and goats, both small ruminants offer good possibilities for meat and milk production respectively but both are susceptible to the diseases and

* Memoria, 3rd Meeting for Animal Production Programming. CATIE, Dept. of Animal Production, 1981.

parasites of humid climates. There is a further constraint in that there is practically no tradition of raising sheep and goats by small farmers. Farmer's preference is a factor in introducing these small ruminants. The small animals will logically fall into mixed systems research when that is begun.

The design, execution, analysis and write-up of experiments is highly correlated with the preparation, experience and backstopping of the personnel who do these things. Based on the qualifications of the personnel, the quality of the research is probably quite adequate.

Experimentation with animals on small farms is limited by small numbers of animals of similar sex, age, weight, stage of lactation, etc. Variability among experimental units is great. The investigator who visits the farm two or three times a week can never be positive that animals were ~~assigned~~ ^{maintained continuously in the treatment group} or the farmer decides it is just too much trouble to manage two or three groups. Results acquired on the farm may be classified as experience as much as experimentation, ^{Results acquired demand a} ~~and demands a~~ careful, even cautious appraisal. On the experimental station, the researcher has much better control of experimental materials and animals. There are more pens or lots available and station personnel are trained to maintain the integrity of the experiment.

The judgement of the team is that both types of investigation, on-the-

farm and on-the-station, are useful. The mix developed so far is reasonable, and ~~compatible with the Project Agreement~~ (over)

EXTENSION

In consideration of the fact that very little attention has been given to "extending" the alternatives beyond a few farmers in localized areas, there has been little extension methodology to evaluate. The team feels that some comments are in order regarding the efforts that have been made:

In some instances, representatives of the national extension service were very active and considered themselves as partners in the evaluation and verification trials; in other^s, there was little or no participation by local extensionists, even though they had been invited. Can Project personnel give more attention to local Extension involvement, perhaps by obtaining a commitment at higher levels of government?

Several trials visited were advertised along the road, and were well labeled at the sites; other carried ^{no} ~~no~~ identification whatever. Identification can serve to make other farmers aware of the work and may pique their interest.

Field days had been held at many plots. If the purpose is to increase quantity or quality of yields, such field days should be held at har-

It is conceivable that in the development of small-farmer systems, the matter of genetic improvement of the animals will arise. This does not imply long-term animal breeding research.

Rather, at the farm level, a part of the model can and should include culling older, damaged, and other low-producers, replacing them with more productive purchased animals or home-bred replacements.

It should also include the selection of breeding males of whatever type that fits the local model, whether through artificial insemination, purchase, or other means of acquisition. ~~Re-~~ ~~placing~~ ~~in~~ ~~productive~~ ~~animals~~ with more productive ones slowly increases the average genetic merit of the group. All of this is part of the farm dynamics and would not delay the project.

Long-term breeding projects for improving or developing a breed would not fall into the scope of this Project.

vest time particularly, so that visitors can see tangible results. At that time, all farmers should be told about the actual cost of any additional inputs; cost in terms of increase^d labor, (if applicable) and the value of the increased yield.

Many of the farmers visited by the team were certain that yields were greater on the trial plots, but had no idea of the cost of the additional inputs.

CROPS

The CATIE staff has done an excellent job in site selection and experimental designs. There has been a great deal of emphasis on varietal trials and herbicide trials. More work is needed on fertilizer trials using complete factorials plus a minor element treatment. Some of the research scientists are conducting fertilizer trials using complete formulas so it is not possible to separate out the fertilizer response of N, P₂O₅ and K₂O. The scientists indicated that it is impossible to purchase triple superphosphate and potassium chloride in some countries so that levels of complete formulas had to be used. ^{Some of} The formulas available were 15-15-15 and 12-24-12. It will be necessary in the future for CATIE to purchase urea, triple superphosphate and potassium as well as ^{minor} elements, so that complete factorial experiments can be conducted. ~~It may be necessary to transport the fertilizer to other countries where it is not available.~~

The complete factorial experiments are very important because the farmers in many areas may be spending thousands of dollars for potassium that does not give a response in corn, rice and sorghum production. 22

The experiments are executed properly but more time could be spent on monitoring the program by scientists from the Central Office. The data collection is good and in some cases more data may be collected than is really necessary.

The data analysis is good ^{but} the dissemination of research results could be improved. The scientists need to develop flip books of the validation trials and make videotape of how to establish validation trials so they can train extension personnel in improved ^{Techniques} technicians in order to multiply the effects of the validation trials in a short period of time.

There is ^{insufficient ?} ~~inefficient~~ data at the present time to prove the methodology for mixed systems and extrapolation. This is the first year that the experiments have been placed in the field in ^{of the} four countries. The maps show that 40 trials are in the field in ^{four} ~~for~~ different countries. This is the first year that data will be collected on this type of experiment. The rainfall at tassel time has been extremely low so the yield results will also be low in several areas; therefore, the data for 1982 will not be very meaningful.

An extrapolation experiment should have at least five years ^{of data} ~~for data~~ in order to have a fair degree of reliability, ~~in the data~~. It would be desirable if the extrapolation experiment could be conducted for at least ^{four} ~~for~~ more years after the termination date of the project.

The data on rainfall and soil analysis will be very valuable ~~in the future~~ for making recommendation in the future. In some locations the same variety of cowpeas was not used so it will be difficult to separate out the effect of inheritance and environment. The hybrid H-9 was used in all location so this will provide field data for simple and multiple correlation^s of yield on soil analysis and rainfall.

The program for ^{the} ~~a~~ mixed system is just getting underway so it will require at least four more years to obtain reliable data on mixed systems of farming.

I. Evaluate the quantity, quality, cost-effectiveness and appropriateness of project funded training to the needs and priorities of the region.

Because CATIE is implementing several regional agricultural development projects and receives support from several donors, it has the unique potential to pool its training resources to contribute to the global needs of the institution and the individual countries. For example, an in-service training course on data analysis may also serve national personnel involved in other projects. Long-term overseas training for an individual in one project may be amplified to provide capabilities which can be useful beyond the needs of that project in a reciprocal fashion. Thus, the end result becomes a larger reservoir of qualified professionals to serve present and future needs of CATIE or the individual countries. Each donor's contribution thus may result in a longer and broader pay-off than originally contemplated. This pooling approach has enabled CATIE to surpass the targets set in the Project Agreement.

Intended outputs for life of project

- 8 cropping systems short courses/workshops
- 4 livestock systems short courses/workshops
- Total of 148 technicians trained

- 8 research info transfer and utilization workshops
- 200 additional extension and outreach personnel trained
- On-the-job training of national
- 11 master degree level candidates

The minimum outputs for the life of the Project had been reached two-fold by September, 1982 except for graduate training and research in information transfer and utilization workshops. In graduate training at the master's degree level, the targeted number of 11 students had been surpassed by 3; but workshops and training in information transfer numbered only 2 of a targeted 8. This is to be expected because useful research information will be generated only after validation data has been analyzed. On-the-job training of nationals is difficult to measure because of the rapid turnover of personnel in some countries or the lack of sufficient counterpart personnel. In at least one instance, local personnel avidly participate in the Project because the CATIE activities are the only on-going remnants of agricultural developments in their war-torn country.

F

J. Review research and implementation reports to determine:

1. Whether they are prepared and presented to give a clear understanding of what CATIE and the national agencies are doing;
2. Whether the bilateral USAID missions, host country officials and AID/W are aware of these reports; and
3. How they can be improved.

The evaluation team was provided with a complete set of periodic reports which included:

- Annual plan of work
- Bi-monthly or quarterly reports on livestock systems work
- Bi-monthly or quarterly reports on cropping systems work
- Annual cropping systems reports
- Annual livestock systems reports
- Annual reports by country

Activities at the headquarters and in the several countries have been well documented, particularly concerning CATIE's involvement. Continuous improvement is sought on the basis of user suggestions and Project experience. For examples, the names of the technicians associated with each activity are to be included in future reports; and detailed descriptions of trials formerly included in the bi-monthly and quarterly reports will be capsulized. Some of the reports include items which have little lasting value from the Project viewpoint.

USAID and host country officials contacted stated that they do receive progress reports but do not necessarily peruse all of them. In some cases, they were read from cover to cover by officials who were inti-

mately involved with the Project. Most of the periodic reports are reproduced in about 35 copies, with at least one being sent to AID/W. The CATIE headquarters maintain's a separate mailing list of government and agricultural workers who are interested in research findings of the Project and journal papers prepared by its specialists. The mailing list number is 619 persons. In addition, 492 individual requests were received in 1981 for 7712 documents.

K. Examine presently planned levels of financial contributions by CATIE, national agencies, other donors, and ROCAP and assess whether they have been provided as planned and are sufficient to achieve the project objectives.

CATIE is currently deriving funds from 48 different sources. In addition, CATIE works cooperatively with numerous national and international entities that provide resources for these efforts. In a very broad sense, ^{many} ~~all~~ of these resources of other entities ~~has~~ bear upon the SFPS Project in an indirect or direct way. The diversity of CATIE activities with other entities precludes a donor by donor or institution by institution review of the ^{direct} contributions and impacts of other assistance on the SFPS Project. ~~However,~~ Discussion will be focused, therefore, on the contributions of other entities most closely associated with the SFPS Project.

(NOTE: Information and data receive too late to incorporate into this draft)

L. Analyze the relationship of this project to any other AID-funded small farmer research programs at the country level, within the region and elsewhere, and recommend how relationships can be fortified.

(NOTE: Information available to evaluation team on AID-funded small farmer research programs within the region and elsewhere was insufficient for adequate response to this issue in this draft.)

ROCAP

ADDITIONAL NOTES/QUESTIONS

1. Can it be determined if the project has/is favorably influencing national governments to focus more resources/commitment on research?
Have national units formed multidisciplinary teams to address FSRE?

The personnel contacted from national governments have mentioned that the governments are planning to spend more money on research in the future. They also indicated that most of the funds will be allocated to research station so that most of the research will be conducted on the research station. They mentioned that there is a shortage of funds in the budget for vehicles, fuel and spare parts so that it is difficult to conduct applied research on farms.

Certain types of experiments like plant breeding, herbicide and pesticide trials can be done on the experimental station but fertilizer and variety trials should be done on farmer's farms. Validation trials on herbicide, insecticide and fungicide trials also need to be done on farmer's farms to determine if the applications are economical.

Research personnel in Honduras, Guatemala and Panamá have formed multidisciplinary teams to work on small farms but Honduras has had problems of implementation due to budget cuts.

2. Is extension adequately involved, especially in validation?

Are any private sector groups involved?

The Project is innovative in the sense that it is trying to incorporate all possible considerations in arriving at research findings which are meaningful to farmers. Unfortunately, there seems to be little concern about systems to move these findings to the masses of farmers who could become beneficiaries of the findings.

Some USAID, CATIE and national officials feel that the extension of the systems technology should be the responsibility of each individual country and this would be logical theoretically. The reality is that the demonstration approach envisioned in the Project will not be completed until the methodology of conveying the results at the national level is also tested.

In the team's inquiries, it was learned that the local Extension Services were invited to take part at all stages of the local activities. Some countries were active in this participation, while in others, the manifested interest was spotty. The latter could be explained by staff shortages, or transport difficulties, or even indifference to the Project. Regardless of the reason, this represents the weakest link in the research to farmers communication.

No direct participation by private sector groups was reported.

ROCAP QUESTIONS

- 3. Can workshops, seminars, short courses, etc. be made more cost-effective?
Any training modules, packages units developed, especially on methodologies?

The training element, a traditional strong point for CATIE and its predecessor organization, has far surpassed the Projects planned minimum outputs. The team was not privileged to see any sessions in action, but report and outside comments gave the training quality and quantity high marks.

The second part of the questions implies the steps which can multiply the training efforts. Modular texts are used as well as lesson plans. There appear to be possibilities for further "canning" of the testing material in slide/tape or videotape segments. The present limited facilities and personnel for the production of teaching aids precludes any great expansion in this direction.

H

4. Do they take advantage of research results developed by other groups (IRC's, other regional groups, national groups, etc.)?

The interaction and scientific exchange between CATIE and other research groups -- IRC's, regional entities, national institutions and etc., take place in several diferent ways. First, CATIE scientists maintain currency in their respective disciplines through routine review of professional literature. Second, CATIE scientists are in frequent contact with colleagues in other institutions and programs via professional meetings, conferences, workshops, seminars and the like. Third, a nearly constant stream of scientists from throughout the world visit CATIE. Fourth, CATIE professionals travel frequently within the region and are in almost continuous contact with colleagues from national institutions. Fifth, CATIE sponsors and/or co-sponsors workshops ^{and} seminars at Turrialba and other locations. The recent workshop on Research on Crop-Animal Systems jointly sponsored by CATIE, CARDI and WINROCK International is an example.

These interactions and exchanges with scientists from other research ^{entities} are evident in the offices of all CATIE professional. Publications and literature of other institutions are abundant. The main library and the specialized departmental and personal collections manifest professional interactions with individuals in other research programs.

The question of whether CATIE scientists "take advantage" of research results developed by other groups can be clearly answered in the affirmative. Research results of other groups are, of course, sifted, further researched, refined and modified to fit CATIE's needs and

conditions. Genetic materials from IRC's and international and national germ plasm banks are being continuously tested in CATIE research and introduced into the region when found superior. Validation trials, for example, are currently using corn and sorghum varieties from El Salvador and a tomato variety developed in Florida. As indicated elsewhere in this report, initial results appear promising.

The evaluation team found strong evidence that CATIE scientists are not working in isolation. Research results from other national, regional and international programs are, we believe, being quite effectively applied in the overall CATIE research effort and the SFPS work.

I

5. Is data collected the most pertinent? Should it be increased? Decreased? What happens to it?

The SFPS Project has resulted in the collection of a massive quantity of data. Every step in the SFPS research process has involved data collection. Every project output from the development of research methodology to the extrapolation of research findings has resulted in the collection of data. Data collected range from the very general to the highly specific and from the static to ^{the}dynamic. The magnitude of project-generated data is such that computer cataloging is the only rational and feasible data management alternative.

The initial reaction to this data mass by the outside observer is usually shock, bewilderment and confusion. But a better understanding of the project's highly complex nature reveals the pertinence and necessity for the collection and analysis of truly massive quantities of data.

SFPS researchers have chosen a "science" rather than an "intuition" approach to their farming systems work. This decision was made at the outset of the previous Cropping Systems Project. It remains in effect in the current project and appears to be an issue closed to debate. The veteran Farm Management Professional lauds the objectives of scientific quantification, but trembles at the task SFPS researchers have undertaken.

Given the decision to approach farming systems research in a highly scientific manner, it could be argued that even the data mass collect-

ed and being collected is insufficient to obtain required information. There is evidence, however, that available data is underutilized. As of the time of this writing, it was reported^{ed} that about 80 percent of the collected data had not been analyzed. This is disturbing.

Inquiries into why such a limited part of collected data have been analyzed were only partially productive. Certainly one factor has been CATIE's limited computer facilities. Until three months ago, CATIE's computer facilities could be termed grossly inadequate. The computer for example, could not utilize standard statistical packages such as SAS. Thus, analysis often required writing of specialized programs. Programming resources were very limited and a large backlog of work was typical. Alternative computer facilities were available at IICA headquarters in San José, but the logistics of routine use were highly time consuming.

The computer problems has now been resolved with the acquisition of new equipment. Programming staff can now spend most of their time assisting analysis. If inadequate computer facilities have been a major constraint to data analysis, this should no longer be the case.

Turrialba-based SFPS professionals contend they have had insufficient time and/or research assistance to perform desirable data analyses. The demands of project administration, supervision, reporting and

regional travel are cited as being very great. The evaluation team has no basis for disputing these contentions. Likewise, attempts to assess the quantity and quality of research assistance available to project professionals was inconclusive.

Regardless of the reasons for the apparently limited analysis of available data, the fact remains that data collection has exceeded data analysis capabilities. This may ^{now} ~~be~~ be rectified with new computer facilities. However, concern must be expressed about the relevancy and usefulness of analyses of data collected in earlier project phases.

It is recommended that careful thought be given to what types of data should be collected for project needs. A sharp distinction of what is perhaps desirable and interesting and what is truly needed to carry out the research needs to be made. If agreement among researchers cannot be reached on this matter, a means for bringing more analytical resources into the project will need to be developed.

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9/24

J

6. Does the work of the animal section, especially small animals, fit FSR? Is it systems work?

The term "systems", as used by the animal production scientists in CATIE refers to the class of livestock and also the manner in which it is managed. Examples: (1) low-land cattle farm-dual purpose cattle-milked once a day-milk made into cheese; (2) mixed farm - two or three classes of livestock enterprises and crops.

~~The work of the animal section is oriented towards the small animal farms (mainly cattles) where it is important to produce as much of the feed requirement as possible on the farms. Many of the cattle farms have a few pigs and chickens as well.~~

Some on-farm work with swine has been initiated in the Guápiles, Costa Rica area. Work at Turrialba tests bananas, sugar cane and different sources of protein. This research on "components" should be transferable with only minimal on-farm testing.

The swine program is also looking into the use of selected criolla type and crosses as these appear to be more disease resistant.

The sheep and goat investigations are yet on the Turrialba station where experiences in their management is being acquired. Some small scale trials are under way with lactating milk goats ^{for} testing various forage crops for feeding. Similar forage studies for sheep are planned or on-going.

The small animal work is systems work. Individual small experiments and feeding trials are the preliminaries to the on-farm small animal módulo ^{and} ~~is~~ mixed módulo - probably the latter.

7. Any feedback from farmers on their perception of the promotes systems?

The profitability/risk perception?

Discussions were held with many farmers and they are convinced that fertilizer, herbicides and improved varieties are economical and they plan to buy them and use them in the future. They pointed out that when the rains come after planting it may^{not} be possible to get in the field for two weeks to weed their corn. They said that when it dries out enough to get in the field to weed the corn, the weeds are so far ahead of the corn that they can not weed the corn before the next rain starts. Some farmers were losing half or more of their production due to weed competition with the corn.

The validation trials proved to the farmers that they needed fertilizer and a high yielding variety. The results were very striking in the validation trials between the plots that received improved practices and the plots that received farmers practice.

Many of the farmers were not convinced of the use of insecticides and fungicides except for the tomato growers. Most of the tomato^s growers were convinced that fungicides were needed to control fungus diseases on tomatoes. Nematodes are a problem on tomatoes so it would be desirable to import seed of hybrid tomatoes from the University of Hawaii so they could be included in the variety trials. Some of the hybrids in Hawaii are resistant to nematodes and seven other fungus and bacterial diseases.

Seeds of tomato varieties also should be imported from the Asiaⁿ Vegetable and Development Research Institute in Taiwan, Taiwan. The research staff has developed varieties and lines of tomatoes resistant to several di-

seases and they yield well even under high night temperatures. ^P The livestock farmers interviewed by the team ranged in attitudes from enthusiastic to almost ecstatic. The latter case was a recent convert from crops farming to cattle and grassland. He explained that now his work load is greatly reduced and he has a steady income from milk.

It must be stated, however, that the cattle farmers interviewed were cooperators with on-farm research and that much of the capital investment in fencing, milking, stables and ^{purchases of} some kinds of inputs (molasses, minerals, etc.) were paid by the ^P project. What ~~was~~ ^{is} not ~~known~~ ^{known} and what ^{the} ~~we~~ ^{is} hoped ~~we~~ ^{is} the Project will later show is how ~~these~~ ^{the} investments can be amortized and in what time frame. From that information one can estimate the likelihood that other stock farmers will be candidates for módulos.

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9/24

8. Other perceptions of the farmers as to missing elements or availability of inputs, T.A., market, etc.?

Many of the farmers in Guatemala, El Salvador and Honduras indicated that more information is needed on marketing for vegetable crops. It would be desirable to add a marketing component to the present project or encourage the local government to do some marketing research. The problem seems to be serious for cabbage, cauliflower, broccoli, cucumbers and tomatoes. Marketing was not a problem for corn, beans, and sorghum.

Many of the ~~cases~~ farmers indicated that credit was a restraint. They indicated that there was a lot of paper work involved and that the inter ^{rates are} ~~est~~ was high. They also mentioned that it was difficult to obtain a loan if they did not have a clear title ^{to} of their property. It would be desirable to encourage other agencies to try ~~and~~ ^{to} improve the credit situation for small farmers.

In the case of livestock farmers interviewed, none of the items listed ^{in the question above} ~~constraints~~ ^{constraints} were mentioned as ~~constraints~~. Credit was the one thing they almost invariably bring up. They mention time and trouble involved in the paper work and they deplore the high interest rate.

9. Any perception of the costs of the research as compared to other similar projects? Avoid broad generalizations.

The cost of alternative research on farms is expensive due to the high cost of fuel for vehicles and maintenance of vehicles using unimproved roads. The pay off for on-farm research is very high since the farmers will accept an improved package of practices on his farm when he sees how it compares with his own practices. The effect of a package of an improved variety of corn with proper fertilization and use of a herbicide is very striking. The farmer can observe the difference and the farmers field days provide a good multiplier effect.

One recommendation for farmers field day is that they should be conducted on the day the plants are harvested. The producer should be placed in front of the row treated with a large sign indicating what the treatment has been. This provides the farmer with a visual correlation of field and treatment. Many of the field days conducted in the past have not been on a harvest day.

Alternative research on farms may prove to farmers that they do not need potassium on some soils to produce a good grain crop; therefore, they can save thousands of dollars by not buying fertilizers that do not have an economic return. On-farm research in many countries has proved that research is a good investment.

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9/24

10. Do technology packages or systems recommended contribute to conservation/maintenance of resources?

Technology packages recommended do contribute to conservation and maintenance of resources. On-farm research has shown that farmers can plant corn and beans with minimum or no tillage if they use herbicides. This saves the small farmer ^{the} ~~to~~ cost of renting a tractor or bullocks to prepare his land. Many times it is difficult for the farmer to rent a tractor or bullock at planting time because of the demand at that time.

Alternative research on-farms has also shown that potassium is not needed for grain crops on some soils so the farmer can apply less fertilizer and still obtain high economic yields. In some cases, the farmer may reduce yield if he continues to apply large amounts of potassium over a period of time since it makes magnesium less available to the plant in areas where magnesium is near the deficient level.

In livestock systems research, the financial projections that are so far not developed, will be necessary to appraise the effects of the recommended technology on maintenance of ^{farmer} resources. The team is recommending that the projections be developed.

ANNEX
STATUS OF PROJECT OUTPUTS

METHODOLOGY	Outputs as of 9/30/82	Outputs for 9/30/82 to 10/1/83
1. Animal (1)	A preliminary document concerning the case of Guatemala has been prepared	A complete document concerning all countries will be presented
2. Mixed Farming (1)	We have a preliminary document "Lineamientos generales de una propuesta para iniciar la investigación en sistemas mixtos", Mayo 1982.	Updating of "Research on Crop-Animal Systems" Proceedings of a Workshop June 1982, CATIE, CARDI, WINROCK Int
3. Cropping System (1)	There is a document "Estrategias para el Desarrollo de Tecnología Agrícola. Mejorada en fincas de agricultores de Recursos Limitados, 1979.	This document needs revision and updating, but other project requirements will take most of professional time available
RECOMMENDATIONS		
1. Cropping Systems (10)	Guatemala (3) Nicaragua (2) Honduras (2) El Salvador (2) Costa Rica (2) Panamá (2)	Guatemala (0) Nicaragua (1) Honduras (1) El Salvador (0) Costa Rica (0) Panama (0)
2. Animal Systems (6)	Panama (0) Guatemala (1) Bovine Honduras (1) Bovine Nicaragua (0) Costa Rica (1) Bovine CATIE (1) Goats	Panama (1) Bovine Guatemala (0) Honduras (0) Nicaragua (1) Bovine Costa Rica (1) Pigs CATIE (1) Sheep
3. Mixed Farming (6)	Guatemala (1) (Designed) El Salvador (1) (Designed) Honduras (1) (Designed) Costa Rica (1) (Designed) CATIE (2) (Testing)	Guatemala (1 tested & validated) El Salvador (1 developed) Honduras (1 developed) Costa Rica (1 developed) CATIE (2 developed)

STATUS OF PROJECT OUTPUTS, CONTINUED

<p>4. Information on 18 analogous areas (RPA)</p>	<p>We have information for: Honduras, 281 Municipios Guatemala, 325 Municipios El Salvador, 247 Municipios General site information System/site information Climate information Soil information</p>	<p>Nicaragua 135 Municipios</p>
<p>5. Extrapolation methodology (1)</p>	<p>We are testing the methodology in four countries</p>	<p>In 1983 we will write the methodology and present results obtained in 1982.</p>
<p>6. Validation/Transfer methodology</p>	<p>A methodology is under testing in three countries, Costa Rica, Honduras & Nicaragua.</p>	<p>A document containing a first version of validation/transfer methodology will be prepared.</p>
<p>7. In-service training seminars (18 national research technicians)</p>	<p>12 short courses (309 persons) 32 in training service events with the participation of 123 persons 15 Central American and Panamanian professionals graduated at the MS level in problems on cropping and farming systems 16 Non-Central American graduated MS level. Theses prepared dealt with topics on cropping and farming systems</p>	<p>At least four short courses or seminars (soil taxonomy, analysis of cropping systems results, preparation of technological packages and other phases of the methodology). At least more Central American students will graduate with MS degree and present thesis on cropping system research topics.</p>
<p>8. Institutional capacity</p>	<p>CATIE's Department of Crop Production has the capability of advising and assisting national institutions of research through staff contracted with funds provided by other agencies of technical cooperation.</p>	<p>The Crop Production Department will increase its personnel paid with core budget funds by 2 or 3 professionals.</p>

K

LISTING OF EVALUATION TEAM CONTACTS
IN SFPS PROJECT BY COUNTRY

N I C A R A G U A

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Marco Navarro	Agriculture Researcher	IDIAP
D. Carmona	Agriculture Researcher	IDIAP
L. Carranza	Agriculture Researcher	IDIAP
Phillip Shannon	Technical Resident	CATIE - 004

AGRICULTURAL PRODUCERS

6 Cooperative farms
 (Asentamientos)
 2 private farms (owners absent)

EL SALVADORNameTitleInstitutionINSTITUTIONAL CONTACTS

J.F.. Larios	Coordinator	CATIE / <i>ROCAP</i>
_____ Rico	Soil Scientist	CATIE
Gale Roselle		USAID
Francisco Tecum	Pres. Agricultural Cooperative	
Antonio Miranda	Extension Agent	
10 extension staff		
4 zone chiefs		

AGRICULTURAL PRODUCERS

Julio Alvrenga
 Pastos Espinal
 _____ Carvey
 Pablo Peroba
 Hernando Patzicia
 Zaragosa Ruicón
 Enrique Carera

C A T I E

<u>Name</u>	<u>Title</u>	<u>Department</u>
Raúl A. Moreno	Head	Crop Production
Alfredo Serrano	Acting Head	DPA
Carlos Burgos	Coordinator Rocap	Crop Production
Marco Antonio Esnaola	Coordinator ROCAP	DPA
Luis A. Navarro	Agr. econ. and Coordinator Validation ROCAP	DPV
Helga Blanco	Publications Specialist <i>CATIE/</i>	ROCAP
Julio Henao	Statistics and Coordinator Extrapolation	<i>CATIE</i>
Marcelino Avila	Ag. econ. DPA & Coordinator Mixed Systems	<i>DPA - CID</i>
Jorge Benavides	Small Animal Specialist <i>CATIE/</i>	ROCAP
Joseph Saunders	Entomologist <i>CATIE/</i>	ROCAP
Emilia Solís	Communication Specialist <i>CATIE/</i>	ROCAP
Alfredo Serrano	Coordinator BID Project	
Marco A. Esnaola		
Rolain Borel	Pasture Specialist	<i>CATIE</i>
Medardo Lasso	Vet. and small animal researcher	<i>ROCAP</i>
Mario Sáenz	Assistant Coordinator	ROCAP
Donald Kass	Soil Management Specialist	<i>CATIE</i>
Carlos Molestina		<i>ROCAP</i>
Aníbal Palencia		
Gilberto Páez	Director	CATIE
JORGE DE ALBA	HEAD, DPA	CATIE
RICHARD HAWKINS	Physiologist	CATIE

C O S T A R I C A

<u>Name</u>	<u>Title</u>	<u>Institution</u>
<u>INSTITUTIONAL CONTACTS</u>		
Alvaro Cordero	Director of Graduate Programs	University of Costa Rica
Teodoro Cordero	Administrator Experimental Station "Los Diamantes"	Ministry of Agriculture and Livestock (MAG)
José Miguel Carrillo		MAG
Guillermo Fuentes	Resident Animal Production Department	CATIE/ROCAP
Mario Urcuyo	Graduated Student	CATIE
Luis A. Quirós	Resident Crop Production Department	CATIE/ROCAP
Aníbal Palencia	Resident Crop Production Department	CATIE/ROCAP
Medardo Lasso	CATIE/ROCAP Project	CATIE
<u>AGRICULTURAL PRODUCERS</u>		
Jorge Segura	Mixed System Cariari	
Jesús Arce	Livestock Cariari	
Edwin Mesén	Prototype Cariari	
Rafel Corrales	Crop. System Cariari	
Abdón Quesada	Crop. System Cariari	
Samuel Carranza	Crop. System Cariari	
Luis Navarro	Mixed System Guácimo	
ANDRE HELFENBERGER	TURRIALBA	

H O N D U R A S

<u>Name</u>	<u>Title</u>	<u>Institution</u>
-------------	--------------	--------------------

INSTITUTIONAL CONTACTS

Rodomiرو Díaz Zelaya	Regional Director DARCO	MRN
Roduel Rodríguez Ardón	Regional Coordinator PNIA	MRN
Miguel Angel Soler	Assistant Coordinator PNIA	MRN
Alfredo Montes	Horticulturalist	CATIE/ROCAP
Enrique La Hoz Brito	Resident Honduras	CATIE/ROCAP
Roger Meneses	Resident Honduras	CATIE/ROCAP
Jorge Salgado García	Validation Agent	SRN/CATIE
Gerardo Petit	Assistant Investigation	SRN/CATIE
Jorge A. Herrera	<i>* Camp Assistant</i>	CATIE/ROCAP
Heraldo Lavaire Díaz	Investigation on farms	SRN
Juan Aeschlimann Sauter	In charge investigation La Paz zone	SRN
Luis Armando Alemán	Assistant investigation	CATIE
Neftalí Monroy	Assistant investigation	SRN/CATIE
Brian Rudert		USAID
Stephen Wingert		USAID
Charles Oberbeck		USAID
Ramón Enrique Mercado	Field Assistant	CATIE
Osman García	Field Assistant	CATIE
Sario Soro	Credit Specialist	World Bank
Sergio Burgos	Horticulturalist	
Ricardo del Valle	Technician	

AGRICULTURAL PRODUCERS

José de Castellera	Adolfo Juestroza
José Ramón Mercado	José Palencia
Ramón Bonilla	Ramón Valenzuela
Wenceslao Torres	Gustavo Donaire
Rómulo Machado	Gaspar Vasquez

L.

ANNEX _____

PARTIAL LISTING OF REFERENCES

USED BY EVALUATION TEAM

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- a) Abril, Mayo, Junio 1980
- b) Abril, Mayo, Junio 1981
- c) Abril, Mayo, Junio 1981 (Programa de Producción Animal)
- d) Abril, Mayo, Junio 1981 (Programa de Cultivos Anuales)
- e) Enero, Febrero, Marzo 1981
- f) Julio, Agosto, Setiembre 1981
- g) Julio, Agosto, Setiembre 1981 (Cultivos Anuales)
- h) Julio, Agosto, Setiembre 1981 (Producción Animal)
- i) Diciembre, Enero, Febrero 1982
- j) Diciembre, Enero, Febrero 1982 (Producción Animal)
- k) Diciembre, Enero, Febrero 1982 (Producción Vegetal)

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- c) Octubre, Noviembre 1981 (Guatemala)

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- e) El Salvador
- f) Guatemala
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IICA, "Informe de la Quinta Reunión del Comité Técnico y Segunda Reunión del Consejo de Ministros de Agricultura", Mimeo, San José, Costa Rica, Junio 1982.

ANNEX

~~SECRET~~

PROGRAMA COMISION EVALUADORA
 PROYECTO CATIE/ROCAP
 (Tentativo)

Participantes CATIE	Día	Fecha	Lugar	Actividad	Personas a contactar
GUATEMALA					
Burgos, Esnaola Solano	Martes	7 Set.	ROCAP	Orientación	Equipo evaluador
Burgos, Esnaola Solano	Miércoles	8 Set.	ICTA 8-9 am	Entrevista	O. Arjona G. Roldán
Esnaola, Solano 1/2 team	Miércoles	8 Set.	9 am 18 pm	Visita área N. Concepción	A. Rodríguez H. González P. Gamaliel
Burgos, García 1/2 team	Miércoles	8 set.	9 am 18 pm	Visita área Chimaltenan- go	R. del Valle
HONDURAS					
Burgos, Esnaola Meneses, La Hoz	Jueves	9 Set.	SRN 10.30am	Entrevista	Celio Osorio F. Funes A. Silva O. Toro
Burgos, Esnaola Meneses, La Hoz	Jueves	9 Set.	AID 14.30 pm 16.00 pm	Entrevista Viaje Comayagua	B. Rudert
Burgos, Esnaola Meneses, La Hoz	Viernes	Set. 10	SRN 7-9 am.	Reunión Técnico- Nacionales	R. Rodríguez R. Díaz M. Alvarado N. Figueroa
Burgos, Meneses 1/2 team	Viernes	Set. 10	Comayagua 9-14 pm	Visita Campo	Fincas agricultores
Esnaola, La Hoz 1/2 team	Viernes	Set. 10	Comayagua 9-14 pm	Visita Campo	Fincas Agricultores

Burgos, Esnaola 1/2 team	Viernes	Set. 10	Viaje Tegucigalpa 14 pm		El Salvador
La Hoz, 1/2 team	Viernes	Set. 10	Comayagua 14-18 pm	Continuación visita	Fincas Agricultores
La Hoz, 1/2 team	Sábado	Set. 11	Comayagua 7:30-12 m	Termina visita Act. P.A.	Fincas agricultores
La Hoz 1/2 team	Sábado	Set. 11	Viaje Tegucigalpa 12 m.		Managua <i>± 5:00 pm</i>
EL SALVADOR					
Burgos, Larios 1/2 team	Viernes	Set. 10	Oficina CATIE 8-9 pm.	Reunión	Asesores
Burgos, Larios 1/2 team	Sábado	Set. 11	San Miguel 7am-18 pm	Visita campo	T. Aparicio O. Moreno
Burgos, Larios 1/2 team	Domingo	Set. 12	Tejutla 9-14 pm	Viaje Campo	Agricultores Ag. Extensión
NICARAGUA					
Saunders, Sáenz	Domingo	Set. 12	Llegada a Managua		
Saunders, Sáenz P. Romero, R. Arias 1/2 team	Lunes	Set. 13		Entrevista Personal Nacional y AID	
A. Ruiz, V. Blandón 1/2 team	Lunes	Set. 13			
Saunders, Sáenz P. Romero, R. Arias 1/2 team	Martes	Set. 14	Matagalpa	Visita campo	Fincas agricultores
A. Ruiz, V. Blandón	Martes	Set. 14	Matagalpa	Visita campo	Fincas agricultores

COSTA RICA (CATIE)

GPáez, RMoreno A.Serrano,Burgos Esnaola	Miercoles	Set. 15	CATIE	Reuniones varias	
Todo Personal Proyecto 1/2 team	Jueves	Set. 16	CATIE 7:30-9am	Entrevistas	
Todo personal	Jueves	Set.16	CATIE 9:30-11:30 am	Visita campo	
L.Navarro,Saunders, Henao, Howkins Burgos, Esnaola, Avila, Serrano, Borel	Jueves	Set.16	12:30	Entrevistas y consultas específicas	
A.Palencia, M.Sáenz, 1/2 team	Viernes	Set.17	Guápiles 7: am	Visita campo	Fincas agricultores
G.Fuentes M.Lasso 1/2 team	Viernes	Set. 17	Guápiles 7: a.m.	Visita campo	Fincas agricultores
R.González team	Sábado	Set. 18	Viaje a David, Panamá 6 am.		
PANAMA					
W.Bejarano, R.González team	Domingo	Set. 19	Guarumal 6 am todo día	Visita campos cultivos	Agricultores
V.Mares 1/2 team	<i>8:00A</i> Lunes	Set. 20	Bugaba	Visita sitios Prod. animal	Agricultores
Bejarano, Shanon 1/2 team	<i>RIOS IDIAP</i> Lunes	Set. 20	David IDIAP	Entrevistas	S.Ríos O.Chavarria M.Navarro J.R.Arauz
R.González team	Martes	Set.21	Viaje	Regreso a Costa Rica	
	Miércoles	Set. 22	CATIE	Preparación Informe	
	Jueves	Set. 23		Entrevistas finales	