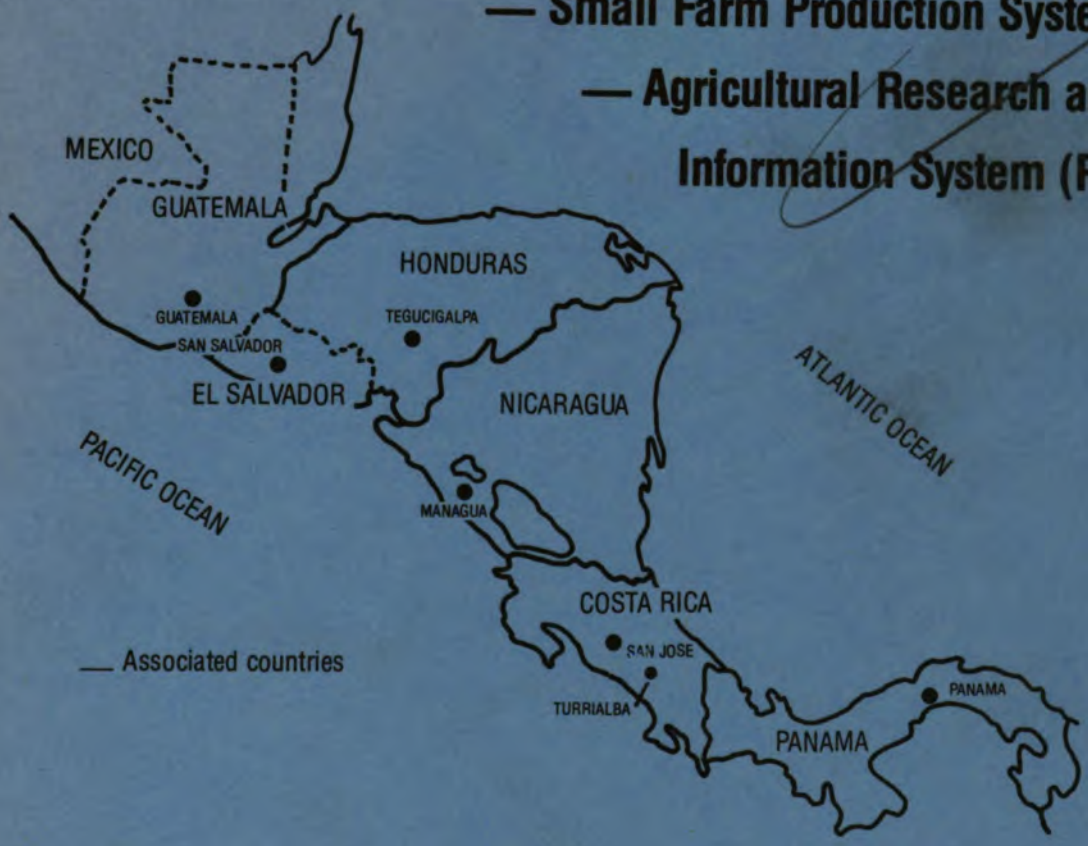
Central America Evaluation of Projects

— Small Farm Production Systems (SFPS)

— Agricultural Research and Information System (PIADIC)



CATIE/ROCAP Project No. 596-0083
IICA/ROCAP Project No. 596-0048

University of Missouri-Columbia
Columbia, Missouri
Evaluation Team

Fred L. Mann, Team Leader
Donald Esslinger — Albert R. Hagan — Harry C. Minor

ROCAP Contract No. AID/LAC-C-1414

March, 1981

EVALUATION

CATIE/ROCAP PROJECT
No. 596-0083 - Small Farms Production Systems (SFPS)

IICA/ROCAP PROJECT
No. 596-0048 - Agricultural Research & Information Systems (PIADIC)

TABLE OF CONTENTS

II. MAJOR FINDINGS AND RECOMMENDATIONS - AGRICULTURAL RESEARCH AND INFORMATION SYSTEM (PIADIC) PROJECT pp 19

A. General
B. Specific
   1. Area Sample Frame
   2. Use of Sample Frames
   3. Area Profiles
   4. Area Profiles and Area Characteristics
   5. Area Profiles and Tech-Packs
   6. Technical Training

III. SFPS - EVALUATION OF PROJECT ACTIVITIES AT TURRIALBA CENTER AND IN COOPERATING COUNTRIES (Project No. 596-0083)

A. CATIE - THE TROPICAL AGRICULTURAL RESEARCH & TRAINING CENTER
   1. Historical Review
   2. Purpose & Objectives
   3. Administrative Structure & Resources
   4. Types of Programs

B. CATIE/ROCAP Project 596-0064
   1. Purpose & Procedures
   2. Accomplishments

C. SMALL FARM PRODUCTION SYSTEMS (SFPS) - CATIE/ROCAP Project 596-0083
   1. Program Objectives
   2. Specific Assignments
   3. Outputs Expected
   4. Evaluation of Annual Crops Program
      a. Program Objectives
      b. Staffing
      c. Procedures and Research Emphasis - Research Methodology - Research Application
      d. Progress Findings
   5. Evaluation Of Animal Production Program
      a. Program Objectives
      b. Procedures & Research Emphasis
      c. Progress Findings
   6. Mixed Farming Systems Program
      a. Program Objectives
      b. Procedures and Research Emphasis
      c. Progress Findings
   7. Complete Farming Systems Research Approach Progress & Suggestions

PREFACE

This document is the final report for the evaluations of the Small Farm Production Systems (SFPS) and Agricultural Research and Information System (PIADIC) projects. Field work for the evaluations was initiated on November 15, 1980, by the University of Missouri Evaluation Team shown on the cover page. The assignment was funded by ROCAP through Contract No. AID/LAC-C-1414 dated September 30, 1980.

The purpose of the Evaluation as specified in the contract is to ascertain progress and any problems that occurred during implementation of the projects.[1]

Chapters I and II of this report summarize the major findings and recommendations of the evaluation team. Chapters III and IV review the two projects in terms of progress and problems that occurred during implementation. They are based on information obtained from project documents as well as from individual and group conferences with personnel of ROCAP, IICA, Central American USAID's and cooperating institutions.

Visits were made by team members to four of the six cooperating countries. Conferences were held with

---

[1]The contract also provided a number of statements and interrogatories to serve as guidelines in the evaulation. These are reproduced in Appendix B.

cooperating country institutional officers and technical personnel, as well as with CATIE, PIADIC and USAID staffs. In addition, personal observations and assessments were made of on-going annual crops and animal production activities, both at research stations and on cooperating small farmers' fields. Information obtained and observations made from these visits are summarized in the Country Reports included as Sections A thru D of Chapter V.

LIST OF ACRONYMS

International Institutions

CATIE - Tropical Agricultural Research and Training Center
CATIE - Caribbean Agricultural Research & Development Institute
CIAT - International Tropical Agriculture Center
CIDIA - Inter-American Center for Documentation, Implementation of Agricultural Information
CIMMYT - Inter-American Center for Maize and Wheat Improvement Center
CIP - International Potatoe Center
EEC - European Economic Community
FAO - Food and Agriculture Organization of the United Nations
GT2 - Technical Cooperation Society, LTD., Federal Republic of Germany
IBRD - (World Bank) International Bank for Reconstruction and Development
ICAITI - Central American Industrial Research and Technology Institute
IDB - Inter-American Development Bank
IDRC - International Development Research Centre, Canada
IFAD - International Fund for Agricultural Development
IICA - Inter-American Institute of Agricultural Sciences of the OAS
IPPC - International Plant Protection Center
NSF - National Science Foundation
OAS - Organization of American States
OTS - Organization of Tropical Studies
UNESCO - United Nations Education, Scientific and Cultural Organization
USAID/ROCAP - U.S. Agency for International Development/ Regional Office for Central American Programs

National Institutions

MAG - Costa Rica, Minority of Agriculture and Livestock
ITCO - Costa Rica, Institute of Lands and Colonization
ITCR - Costa Rica, Technological Institute
CACTU - Costa Rica, Agricultural Center of the Turrialba Canton
MIDA - Panama, University of Agricultural Development

IDIAP - Panama, Agricultural Research Institute
MAG - El Salvador, Ministry of Agriculture and Livestock
CENTA - El Savador, National Agricultural Technology Center
SRN - Honduras, Natural Resources Secretariat
BCH - Honduras, Central Bank
INA - Honduras, National Agrarian Institute
ICTA - Guatemala, Agricultural Science and Technology Institute
MAG - Nicaragua, Central Bank
INTA - Nicaragua, Nicaragua Agricultural Technology Institute

I. MAJOR FINDINGS AND RECOMMENDATIONS[1] SMALL FARM PRODUCTION SYSTEMS PROJECT PROJECT 596-0083

A. General

1. Professional staff at CATIE appear to be competent and well-motivated.
2. Small farmer interest, involvement and acceptance of the on-farm components of the systems methodology has been good. Inability to accommodate all farmers who desire to cooperate has been the primary constraint, rather than the reverse.
3. The CATIE systems research team, within the Annual Crops and the Animal Production Units, are interdisciplinary groups that are working effectively in a problem-oriented context that brings a combination of disciplines to bear in seeking solutions in an integrated manner.
4. The SFPS project has made a significant contribution to the recognition in the region of CATIE as a contributor to solutions of problems of small farm development in Central America.
5. CATIE has developed an appropriate small farm

[1] It is suggested that ROCAP and CATIE or IICA (as appropriate) jointly discuss and reach agreement on the issues raised in all sections of this chapter that include recommendations.

cropping systems research methodology with applicability both to cropping and animal systems. CATIE does recognize that this methodology is not static, and as it continues to be applied, it will be further refined.

6. The production systems (SFPS) approach to small farm production research appears to have permeated CATIE to an extensive degree and now influences most aspects of the annual crops and animal production programs. It has brought about changes in the graduate program and the various research activities in these programs. The SFPS appears to be well integrated with other revelant annual crops and animal production program activities. As a result, the SFPS project has had significant impact on other projects being implemented at CATIE.

7. On several small farm operations observed (and others were reported), CATIE-generated technology improvements had been applied successfully. However, the success of these farm operations seemed to depend heavily upon considerably more than application of the technology introduced. They required intensive assistance by CATIE and/or national institution personnel in obtaining credit (or directly providing resources), locating and

installing inputs, generating markets, etc. This emphasizes the fact that improved technology is a necessary, but far from sufficient, ingredient to transform the income and condition of the small farmer. Without adequate complementary activities of providing access to input and output markets, credit and continuing technical assistance, small farm family improvements will not take place except on a few fortunate farms.

8. A high level of country interest was detected in all the countries visited. This interest has not yet been translated into adequate budget and personnel resource commitments. Although relative levels of budget and personnel commitments by national institutions vary from country to country, considerable progress will need to be made in this respect during the remaining project period before program continuation beyond that period can be assured.

Recommendations:

> CATIE needs to make a much stronger effort at communicating effectively to high level country officials its capabilities and support to national institution programs and the potential pay-offs in terms of achieving country development objectives to accord higher priority (and higher levels of budget and personnel commitments) to CATIE - assisted activities.

9. In all countries visited, USAID's had some awareness of CATIE coolaboration with national institutions and in most cases had provided assistance to the institutions involved although not necessarily directly targeted to CATIE assisted activities.

Recommendations

CATIE should encourage and assist national institutions to make their plans and needs known to USAID personnel.

10. Development of mixed farming activities in cooperating countries has been hampered by the fact that crops and animals country representatives are working in different geographic areas, mainly at the insistence of cooperating institutions. This problem appears to have been precipitated, at least in part, by the fact that CATIE did not present the crops and animals country representatives as joint teams, but rather as separate activity implementators.

Recommendations

In the future, CATIE should encourage joint activities by presenting their own representatives as teams.

B. Specific

1. Development and application of SFPS Research Methodology.

a. Annual Crops -

Much of the CATIE annual crop production systems work involves the introduction of high-value crops (e.g., vegetables and fruits) in combination or association with traditional "milpa" (corn/beans) production. In our view, this is a rational approach that recognizes two characteristics generally applicable to small farmers in Central America: (i) Small farmers will continue to produce "milpa" to assure an adequate food supply for their families; and (ii) Small farm incomes cannot be increased significantly through improved technology in their corn/bean production; rather they must dedicate a portion of their land resource to high value crop production. Combining these two requirements in a manner likely to be acceptable to the small farmer is the real challenge facing CATIE and national institutions.

Recommendations:

It is our opinion that the CATIE focus on combined "milpa" and high-value crop systems is consistent with the challenge described and that this focus should continue to be a significant part of CATIE efforts. This focus is at some variance with the PP. ROCAP and CATIE should agree to the acceptability of this variance.

b. Animal Production

Although the animal production system research has not had the period of effort that cropping systems has had, CATIE has developed appropriate methodologies for the animal systems research.

They treat an animal production enterprise as a unit and are testing non-traditional feeding and management practices.

An important feature of this approach is development of appropriate modules that are being tested at CATIE and are being adapted to individual farms for evaluation and validation.

The entire CATIE animal production program has adopted the systems approach for their work. This includes integration of an Inter-American Development Bank project, as well as CATIE core activities, with the CATIE-ROCAP project in animal production.

The utilization of modules as the basic tool for animal systems research permits treatment of a livestock enterprise as a unit. A possible weakness of this approach might be failure to recognize problems in a farm situation where the animal enterprise is

relatively minor as related to major cropping systems.

Recommendations:

To overcome this weakness, the annual crops and animal production teams should achieve an operating arrangement to effectively join forces in working with mixed systems (discussed further in item c, below).

c. Mixed Farming -

Work presently is under way in the design stage for at least six alternative recommendations for mixed farming systems. However, we do not believe that the remaining project period will be sufficient time to carry these research activities through completed validations. Thus, validated tech-packs for six mixed farming recommendations cannot be completed as called for in the project agreement.

Recommendations:

It is our opinion that insistence on six completed mixed-farming tech-packs will not contribute to the real benefits to be achieved under the project. Rather, greater benefits will be derived by permitting the methodology to be applied in a scientifically acceptable manner. Validation should be well under way by the end of the project period.

It appears likely that some partially validated mixed-farming recommendations can be completed by the end of the period. Accomplishments should be evaluated on the basis of quality rather than on the number.

Even though the validation may not be complete, CATIE should report tentative results, progress to date and planned completion program for all alternative recommendations being tested.

d. Tech-pack Formulation -

Provisions of the CATIE/ROCAP project call for the development of a specific number of technology packages, but we emphasize that the project's success depends primarily upon successfully achieving other outputs - - development of methodologies, institutionalization of the methodologies, and training of country personnel - - rather than on development of technology alone.

Recommendations:

CATIE nevertheless should be required to report up-to-date findings on all alternatives under study. CATIE further should take steps necessary to insure involvement of country extension personnel in the entire evaluation and validation process to insure the most rapid transfer process possible.

e. Complete Farming Systems Approach -

Although CATIE has made good progress in developing the cropping and animal production systems methodology they have not yet attempted to deal with the whole farm as a system. Although the project paper makes reference to the whole farm approach, it was

not expressly included in the project agreement with CATIE. We are not optimistic that CATIE will be able to reach this stage by the end of the project period, although with some adjustment, some useful experience can be gained and methodology adapted.

Recommendations:

CATIE should arrange for specialist assistance to conduct an in-house workshop; to apply on a practice basis with a selected small farm, a complete farming systems research approach. This then should become a case study pilot activity for continuation of records, observations and adjustments throughout the project period. As opportunities arise, similar pilot case studies can be applied in cooperating countries. For example, the cooperating regional director of ICTA in Guatemala expressed interest in such a methodology to assist them in planning "Granjas Familiares" (See Appendix A for a more detailed discussion of this recommendation).

f. Group Farming -

In several cases, CATIE has been asked to work with country institutions in the application of the systems methodology to group farms that have factor endowments and professional management expertise that responds to large farm technology improvement. The questions arises as to whether CATIE/ROCAP resources should be used for this purpose.

Recommendations:

It is our opinion that within the framework of this project, CATIE should not divert significant resources (either ROCAP resources or CATIE counterpart resources) to work on systems technology improvement for group farms not utilizing small farm technology in terms of factor combinations and cultural practices. However, this would not preclude CATIE working this group enterprises where (a) the farmers (individually or as a group) make their management decision, and (b) relative factor endowments and cultural practices used are similar to those used by individual small farmers in the area.

Since the production systems research methodology developed can be expected to be applicable to large farm technology improvement research as well as small farm, and since group farms with large farm factor endowments (e.g., relatively high level of mechanization and/or professional management expertise) are being established in several countries of the region, demands for CATIE assistance to "large farm type" group enterprises likely will continue. We do not object to utilization of present installed capacity in SFPS research to demonstrate on a pilot basis the applicability of the methodology to characterization and design of research in countries where this appears to be necessary to achieve continued support and expansion of on-going SFPS work. However, any activities beyond this should utilize country (and CATIE) resources not diverted from SFPS work.

In our opinion, the individual small farm production systems technology improvement problem is of sufficient magnitude, and small farms constitute a sufficiently large segment of total productive land area and rural population of Central America to justify concentration of SFPS efforts on those countries willing to accept these ground rules. Other resources and capabilities can be tapped to deal with large farm technology improvement.

2. Extrapolation Methodology

a. CATIE has conceptualized the framework of a tentative extrapolation methodology. This framework will be developed in detail during 1981 and tested in 1982. There does not yet appear to be a unified view as to what extrapolation can be expected to contribute to the technology transfer process in Central America, not is there a commonality of understanding as to the specific elements and procedures involved in the extrapolation process.

b. Given the complexities involved, we agree with personnel in both CATIE and ROCAP that extrapolation cannot be developed sufficiently to permit direct transfer of technology packages suitable for use without on-site testing. At the same time, an extrapolation method can be developed to the point of serving as a useful tool to improve the design of on-site testing and validation of alternative technical recommendations. To the extent that a meaningful extrapolation process can be realized to assist in improved approximation at the design stage, the time required to produce a validated site-specific recommendation should be reduced significantly.

Based on consultations with IRRI, CIAT, CRIES, IICA, and review of available literature, CATIE has come to realize the highly experimental nature of extrapolation methodology. The process of selection of parameters and determinants and testing of alternative approaches is considerably more complex than conceived in the project paper.

CATIE has developed, on the basis of its studies to date, three interrelated approaches to extrapolation to be tested. At current level of effort it appears that they will be unable to adequately evaluate any of these (or some combination) duirng the project period. However, they will make considerable progress in testing the selected approaches for two cropping systems (corn-sorghum and corn-beans).

A part of the problem in achieving the outputs anticipated has been the inability to base CATIE site selection on PIADIC area profile studies. In most cases country institution decisions precluded this. Further, area profiles generally have not been ready when CATIE site selection had to be made.

Recommendations:

We are impressed by the level of effort being applied and recommend that CATIE and ROCAP enter into discussions to re-negotiate the outputs to be realistically expected. Since this is a highly specialized field, we further recommend that CATIE obtain the services of a specialist to assist in this renegotiation process

3. Transfer Methodology

CATIE has been attempting to develop plans for carrying out non-traditional transfer techniques research. Progress in this output has been slow partly due to limited experties among present staff. Staffing of six planned positions in this

area was deferred by agreemtn between CATIE and ROCAP. These positions are expected to be filled during 1981.

It is our opinion that achievement of outputs identified during the original project design will require the additional staffing specified. Further, emphasis should be on evaluation of techniques of technology transfer which do not require extensive institutional reorganization. Full advantage should be taken of the considerable resources invested by the U.S. and other countries to develop effective and efficient methods of information transfer.

Recommendations:

> We recommend that CATIE consider concentrating its transfer studies on measurement of the spread effects of the validation phase of its systems research methodology and on the adoption rate of alternative recommendations that have been transferred to extension personnel working with research personnel during the evaluation and validation phases of in-country activities. This could be done on a selected sample basis in two or more countries. At least in Nicaragua, Honduras, and Guatemala, conditions appear to us to be favorable for accomplishing these studies.
>
> It is expected that this study will demonstrate the value of a close working relationship in the field between exterior and research staff.

4. Training

a. We are optimistic that CATIE can meet the

training output objectives specified in the project paper. In doing this, they have capitalized on a long time strength of CATIE.

b. CATIE recognizes the need for continuous and repetitive training for personnel of national institutions because of rapid turnover.

Recommendations:

> Training material produced in modular units using audio-visual techniques should be developed to standardize training information and permit high-quaility repetitive training at relatively low cost.

c. CATIE has organized and carried out a number of in-country and headquarters-based short courses in a competent and effective manner and with good country personnel participation. As a result, several national staff have been exposed to relevant training in a number of appropriate subject areas. On the other hand, except for resident staff, the time spent by headquarters specialist staff on in-country assistance has been rather limited from the point of view of the country institutions. Given the limited size of CATIE headquarters technical staff and the need to maintain contact with six countries, it is not likely that in-country assistance will increase significantly.

Recommendations:

Because of the relatively high rate of country institution personnel turnover, it will be necessary to continue introductory short courses and workshops indefinitely, while at the same time adding more specialized ones. Thus, demand for short-courses, seminars and workshop activities should actually increase as the project continues.

d. Despite the fact that CATIE has done a good job to training as contemplated under the project, we are concerned that there will not be sufficient numbers of adequately trained country institution personnel to carry on a viable program beyond termination of the CATIE/ ROCAP project.

Recommendations:

In order to have a maximum impact in this respect, CATIE country residents must be especially sensitive to the need to encourage involvement and initiative of the largest possible number of country institution personnel.

5. Financial Management

There presently is no procedure for financial management in the hands of CATIE project activity leaders. A financial management system is required that permits project activity leaders to keep informed on activity expenditures as related to activity progress and to manage their expenditures accordingly. On the positive side, expenditure

budget control and management for country programs has been put in the hands of the country residents. However, financial management then by-passes the project activity leader at CATIE and resides directly in the hands of central program management.

Recommendations:

CATIE should devise a financial management system that permits personnel responsible for coordination and planning at the project major activity level (e.g., in the case of the CATIE/ROCAP project, at the level of the annual crops, animal production, etc., coordinator) to keep current on periodic and cumulative budget expenditure patterns by line item. Financial management also should be exercised at this level for country expenditures as well. Present cash flow problems at CATIE might have been flagged earlier had this been in practice.

6. Other

a. An administrative-type problem is the project requirement to submit annual plans by November 30 each year - - prior to harvesting and evaluation of the current research and before in-country annual plans are developed. In most cases, these are prepared in the January-February period, making it difficult for the Country Representative to coordinate his planning with that of the National institutions, without much waste of time and effort.

Recommendations:

CATIE/ROCAP staffs should consider the feasibility of shifting the acceptance date for annual plans to February 28 - - a date more suitable for CATIE staff for reasons earlier stated.

b. The organizational structure of technical activities at CATIE creates some difficulty in carrying out multi-disciplinary work in the whole-farm context. Some difficulty has been experienced in joining the annual crops and animal production efforts to achieve appropriate integration for applying the systems methodology in mixed farming. At the country level, this organizational division of technical areas tends to exacerbate similar or commodity oriented organizational structures of national institutions. This explains in part the delays involved in undertaking the mixed farming research.

Recommendations:

A partial solution to the in-country problem of integrating the two areas of research might be to present the crop and animal residents as a team and not as persons representing distinct programs.

The filling of the project coordinator's position at CATIE could be expected to help in overcoming this problem.

In the longer run CATIE needs to examine the feasibility of adding a farm management program to the four already in place.

c. Information management looms as a potentially serious bottleneck to efficient progress by CATIE in generating information useful to technology transfer institutions and in assisting national research institutions to do so.

Recommendations:

The person recruited to fill the position of project coordinator should have experience in this area.

II. MAJOR FINDINGS AND RECOMMENDATIONS - PIADIC PROJECT 596-0048

A. General

1. Following its initial project phase, PIADIC underwent a complete reorganization, resulting in a narrower scope of work and a greater focus on individual country rather than regional needs. We agree that the changes made resulted in a more viable and manageable project.
2. PIADIC has effectively stimulated region-wide interest in improved methods of data collection, analysis, and use. Because of different starting times, different personnel and financial resources, and different objectives of country institutions, each country has progressed at different rates towards institutionalization of information systems.
3. We have found those bilateral AID missions visited strongly supportive of those parts of the PIADIC program which were of most interest to the individual countries. Services provided by PIADIC staff have been of uniformly high quality, although in some cases too limited in availability to fully meet the demand of country programs.

4. Several parts of the PIADIC project coincide with IICA's longstanding commitment to documentation and data storage. PIADIC activities related to these interests have already been incorporated into CIDIA by IICA. We do not feel, however, that IICA has demonstrated the interest nor commitment necessary to continue the several service and training aspects of the PIADIC project related to area frame and data base structuring. This lack of commitment is reflected in the fact that at least 47 person months of IICA financed professional position has not been filled.

5. The incorporation of PIADIC activities by IICA into its core program, as envisioned in the project paper, still appears to be the most efficient means of ensuring program continuity and eventual achievement of unaccomplished goals. Advantages we can cite for continuity of a core staff at the regional level include:

   a) Consistency of methodology to the extent acceptable to the countries in the region;

   b) A build-up of experience which should contribute to increased efficiency;

   c) Enchancement of the development of regional information interchange to the extent that such an interchange is mutually desirable to the countries involved; and

d) economies of scale in the utilization of specialized expertise.

6. In the countries visited, progress toward end-of project outputs has advanced little beyond application of area frame sampling procedures. Area profiles have been constructed in Nicaragua (2), Honduras (4), and Costa Rica (4). Area profile construction by December was planned by Guatemala (1) and Panama (2). We receive no information for El Salvador. In our visits, we did not learn of significant country activity in development of national information centers, although Guatemala actively is planning for this purpose.

7. Nine months into the project extension (January 1980), IICA completely restructured its handling of the PIADIC project. From a division of CIDIA with its own administrative head and budget, PIADIC was shifted to project status. As a project, PIADIC was to interact with and work in all appropriate IICA lines of action. While there may have been good reasons to make this change, in our view this action reflects a tenuous commitment to PIADIC on the part of IICA.

Recommendations:

PIADIC should be made a permanent part of the IICA structure to ensure a firmer foundation

for continuing the necessary technical assistance needed by the cooperating countries.

8. There exists good rapport and an effective working relationship between the ROCAP and PIADIC project managers.

In the countries visited, there is a limited ability at this time to support the development of information systems without outside assistance. However, we see early signs of a strong commitment to such activities. In Guatemala, a law is being prepared which proposes establishment of an information gathering and analysis system as a budgetary item. In Nicaragua, most of the funding currently available is from internal sources. Continued bilateral support appears necessary until the usefulness of information systems has been demonstrated to national planners and other users.

Recommendations:

AID missions should consider further funding for development of specialized agricultural and information centers.

9. IICA's capacity to collect, analyze, and interpret data has been strengthened by the PIADIC program. Expertise with area frame construction and utilization and data base structuring appear to reside mostly with ROCAP funded staff and will be

lost unless this, or similarly experienced staff, is incorporated into IICA.

Recommendations:

To continue the technical assistance necessary to fulfill expected demand from participating countries, persons in the following specialties should be retained by IICA;

a) Area frame development and use
b) Natural determinants information
c) Socio-economic data
d) Agricultural technology
e) Systems analysis

B. Specific

1. Area Sample Frame

According to country residents and PIADIC personnel, the area frame is being used for data collection (under construction in Honduras) in five countries in the region and a variation is used in Panama. Of the countries visited (Nicaragua, Honduras, Costa Rica, Guatemala), only Nicaragua has a completed and institutionalized area frame.[1] It was reported to us that the area frame also is complete and institutionalized in Panama and El Salvador. We perceived a need for

[1]According to INEC management, the Nicaragua area frame sample permits aggregation only at the national level. The PIADIC area frame specialist indicated that the size and design of the sample can provide useable estimates at the regional level. The problem may lie in the quality of enumeration or procedures for calculating variances and making expansions.

continued technical support for area frame construction adjustment and utilization. Specifically, we do not feel that the project assumption that the system would be institutionalized in each country by the end of the project will have been met. We could not ascertain to what extent IICA's failure to staff positions in this area contributed to the shortfall.

Recommendations:

> IICA and ROCAP should seek support for continued maintenance of a technical capacity within the region to provide coordination for this activity and to ensure eventual institutionalization of this system of sample identification and data collection.

2. Use of Sample Frame

Data collected via use of sample frames is having an impact on national programs within the region. In several cases, this impact clearly still is in the "potential" stage since area frame development is incomplete. Of the potential users of data from area frame sampling, those involved in national planning will probably find the information most useful. Because of the scale of the area frames being used, little site-specific information is being developed at present.

Recommendations:

> AID missions consider further funding for expansion of area frames and survey work

based on them to make collected data more meaningful for implementing agencies within the public sector.

3. Area Profiles -

Area profile methodologies and procedures being used are similar in all countries, but have been adjusted to fit the needs of each country. In order to maintain uniformity of methodology and procedures within each country, country institutions should be encouraged to develop an area profile manual with PIADIC assistance, with this leading to a working CRIES or similar system.

4. Area Profiles and Area Characterization -

There has been no convergence between PIADIC area profiles and CATIE are a characterization. Those in the countries vented are indifferent geographic areas and are vastly different in scale. We are not concerned about this for the project period. However, we feel that as area profiles continue to be developed using the PIADIC methodology, the two activities could eventually achieve convergence both in geography and scale.

5. Area Profiles and Tech-Packs -

Tech-packs produced from area profiles include recommendations that only are applicable generally to the specific area and crop. The PIADIC project

manager believes one result has been that the PIADIC Project has lost some crediability among potential users and amoung research and extension personnel. All the information in a tech-pack is available to the potential user in a detailed area profile. Therefore we believe that it is in the best interests of the PIADIC project to concentrate on area profiles and abandon the generation of tech-packs. Appropriate research and extension staff then can combine their own research information with area profile information in developing technical recommendations.

6. Technical Training -

PIADIC has provided appropriate technical training in the areas of sample frame and data base development methodologies. Because of rapid turnover of staff in most Central American countries, it appears evident that training must be continuous to maintain a trained core staff at the country levels.

Recommendations:

> IICA installed capacity should include sufficient specialist personnel to continue the needed training at their headquarters as an outreach activity. Training materials should be developed that build on experience on person-to-person technical assistance. The instruction should be produced in modular units using audio-visual techniques. The package of instructional units would

standardize the training informaiton and allow the participant to learn without having the technician present, and to work at his or her own pace.

III. SMALL TOWN PRODUCTION SYSTEMS (SFPS) - - EVALUATION OF PROJECT ACTIVITIES AT TURRIALBA CENTER (Project No. 596-0083)

This section of the report treats the responsibilities and functions of CATIE and relationships with ROCAP and country institution programs associated with Project 596-0083. Primary attention is given to the work at Turrialba in developing research methodology and in conceptualizing and testing annual crop and animal components appropriate for small farm production systems, as well as the interface with cooperating country activities.

Evaluation of progress is prefaced by a brief review of CATIE and of the related preceding project (No. 596-0064).

A. CATIE - The Tropical Agricultural Research and Training Center

1. Historical Review

CATIE was established in June, 1973 through an agreement between the Government of Costa Rica and IICA (the Inter-American Institute of Agricultural Sciences of the Organization of American States) with headquarters at Turrialba. The origin of IICA, which founded the Turrialba Station, dates back to 1942.

Its purpose was to initiate and conduct teaching, training, and research in agriculture, forestry and animal production. Two sub-organizations of IICA

preceded the founding of CATIE - - the "Centro de Enseñanza e Investigación (CEI)" and the "Centro de Enseñanza e Investigación (CTEI)". CEI functioned from 1960 to 1969 and was succeeded by CTEI in 1970. Both organizations stressed education and training, especially at the graduate level. Research activities were designed to support graduate training.

2. Purpose and Objectives

The overall purpose of CATIE is to increase agricultural, livestock, and forestry production and productivity, especially that of small farmers of Central America. Its ultimate goal is to improve the living standards of small farmers by making proper use of renewable resources within the framework of national policies.

Specific objectives of CATIE, which harmonize with those of the SFPS Project No. 596-0083 relate to research, training, and the generation and transfer of technology. They have been stated by CATIE as follows:[1/]

1) to promote research, in cooperation and coordination with national institutions, toward development of applicable, farm-level

---

[1/] CATIE - Objectives, Organization & Functions - CATIE Pub. September 1979.

technologies adaptable to producer's conditions.

2) to promote training at different levels, in coordination with national institutions, of technical personnel in charge of research and technology transfer in these institutions.

3) to cooperate with national institutions in creation of models to accelerate the process of technology transfer aimed at increasing production and productivity at the farm level.

3. Administrative Structure and Resources

CATIE is governed by a Board of Directors which establishes general policies. A Managing Director is responsible for carrying out the policies approved by the Board. The Director assumes responsibility for overall administration of the Center at Turrialba, including both technical and financial aspects. Deputy Directors serve as coordinators and as an advisory body to the Director. They consist of a Deputy Officer for Training and Technical Cooperation, a Deputy Officer for Research, and an Associate Deputy Officer for Administration.

Four major program areas form the heart of CATIE efforts - - annual crops, animal production, natural renewable resources, and perennial plants. Each program has a program head, or coordinator, who is responsible for efficient use of resources - - human, physical, and financial - - under his direct jurisdiction.

CATIE has 900 hectares of land at Turrialba and another 100 hectares at Limón, the latter being dedicated to cocoa production and research. Also at Turrialba are facilities for research, training and teaching - - including classrooms, laboratories, greenhouses, herbarium, and crop collections. In addition, there are houses for most of the technical staff, guest houses and accommodations for visitors, lodging for 50 single students, a restaurant and recreational facilities. The Center also has an outstanding agricultural library, as well as a computer unit composed of mini-computers.

Personnel resources have substantially increased since 1973. The number of professional staff members, including both core and for special projects, has increased from 34 in 1973 to approximately 80 in 1979.

4. Types of Programs

Research programs at CATIE, and associated educational and training activities, are concentrated in four major disciplines - - annual crops, perennial plants, animal production, and natural renewable resources. For the SFPS project, primary attention is given to annual crops and animal production programs - - both

at Turrialba and within cooperating countries. In some cases, however, perennial plants and forest species are included in investigations to complement and supplement annual crop production and to augment the feed supply for cattle and other livestock. Despite the separation of programs and the assignment of professional staff members to the respective disciplines, progress is being made toward coordinating and integrating research and training activities and orienting them to the problems and needs of the small farmer.

B. CATIE/ROCAP PROJECT No. 596-0064

This first CATIE/ROCAP project (Small Farmer Cropping Systems research project) operated through fiscal years 1975-79 and established a foundation for the expanded SFPS project now in progress. Contributions of the earlier project to the current program may be

revealed more clearly by a brief review of its purposes and accomplishments.

1. Purpose and Procedures

The overall purpose of this project was to develop a capacity at CATIE to understand and improve the total farming systems of small farmers. The ultimate goal was to help them develop more productive and balanced cropping systems which would provide better nutrition and food security for the family and would yield a greater surplus for higher family cash income.

The procedural strategy for the project was to develop at CATIE a cadre of professional agriculture scientists from several disciplines who would work with national agricultural institutions throughout Central America to conduct collaborative cropping systems research with small farmers, on their farms.

The major deviation from earlier cropping research was to concentrate on cropping systems rather than specializing in mono-cropping projects. Systems may include mono-cropping, inter-cropping, rotations and relay cropping of adapted crops on the same land within a

production period. Another notable change was to shift many projects from research stations to the farmers' own fields.

Development of improved research methodology also was an objective of the earlier project, especially a systematic approach for the adaptive, problem-oriented research to be conducted on individual farms.

2. Accomplishments

Early in 1980, an evaluation team studied the achievements of the cropping systems project and prepared a report which includes a summary of their conclusions and lessons learned from the project.[2/] A condensed statement of these findings provides a view of factors which influenced design of the current project:

1) The project played a vital role in helping CATIE transform itself from a traditional agricultural research and graduate training institution, focussed primarily on mono-crop research, to one with a demonstrated capacity for small farm systems research.

[2/] Central America: Small Farmer Cropping Systems, Impact Evaluation of an AID Supported Agricultural Research Project, February, 1980.

2) CATIE demonstrated that the new methodology could improve multi-cropping technology for increasing small-farm production.

3) The cropping systems approach helped get researchers away from the experiment station to on-farm settings where they learned a great deal about small farmers and their complex problems.

4) The project enabled CATIE to contribute to a more integrated approach to SFCS research in the region.

5) Cropping systems research influenced the farming operations of some of the 75 participating farmers but it is too early to expect large-scale farmer adoption.

6) The project (with appropriate changes) is both replicable and sustainable, and can serve as a powerful tool in helping small farmers.

That evaluation team also itemized specific lessons (guide-lines) which might be useful for future projects. In skeletonized form they are as follows:

1) To maximize potential impact on small farmers, cropping systems projects should be designed to include the full cycle of research through both verification and dissemination.

2) An interdisciplinary focus across all participating disciplines is critical in the farming systems approach.

3) Researchers must differentiate between doing research on small farms and doing research with small farmers on their farms - - unsuccessful vs. successful approaches.

4) The cropping systems methodology can be improved with greater attention to -

   a) Use of more explicit and consistent criteria for selecting farm households for on-farm trials;

   b) More careful articulation of the relationship, if any, of central station experiments to on-farm trials;

   c) More careful analysis of yield and income date from on-farm experiments and their relationship to base-line survey data; and

   d) Non-agronomic elements, such as input constraints, market analysis, and household and area labor availabilities by seasons.

5) Maximum collaboration and information sharing among related projects and programs; and

6) Shortening the time lag between initial experimentation and ultimate impacts on small farmers (Nicaragua experience cited).

The extent to which these suggestions have been observed in the design and conduct of Project 596-0083 is addressed in the current evaluation of progress.

C. Small Farm Production Systems (SFPS) - CATIE/ROCAP Project No. 596-0083

This project is an outgrowth of the CATIE/ROCAP Small Farmer Cropping Systems research project (No. 596-0064) described in the previous section. It was designed to take advantage of the experience gained from the earlier project, from the standpoint of research methodology and working relationships within CATIE and amoung cooperating Central American countries.

1. Goals and Objectives

The overall sector goal to which this project was to contribute is to "improve the regional conditions in which the rural poor will have increased outputs and income from the land they work."

The specific project purpose is to "develop a continuing Central American capability to conduct and convey to small farmers crop, animal, and mixed-farming production systems research."

2. Specific Assignments

In order to contribute to the sector goal and achieve the project purpose, specific assignments were given to CATIE in terms of guiding principles, priorities, and research procedures. There were stated in the project paper as follows:

> In this effort, CATIE and national research institutions in Central American and Panama will undertake a regional program of agricultural research which:
>
> a) places priority on the special needs of small farmers;
>
> b) focusses on the whole farm system of the small farmer and the interrelationships among technology, service institutions, and economic, social and cultural factors affecting small farm agriculture;
>
> c) makes extensive use of field testing on small farmer plots to adapt basic research to local conditions; and
>
> d) places special emphasis on developing methodology for dissemination of research results and recommendations to other small farms in the vicinity and in other similar areas of small farmer agriculture in Central America and Panama.

3. Outputs Expected

The Log Frame for the project specifies the outputs expected by the conclusion of the project in 1983. They are stated here as a point of reference used by the evaluation team in assessing progress toward achieving the outputs during the first year of development.

a) Methodology for development of crops, animal and mixed farming systems recommendations;

b) Crop, animal and mixed farming system recommendations for specific areas;

c) Baseline information and research results where small farms are concentrated;

d) Extrapolation methodology for transfer of cropping systems recommendations from one geographic area to another;

e) Recommendations for transfer of production systems tech-packs to small farmers;

f) Formal training through short courses and graduate training;

g) In-service training through direct participation in field research; and

h) Institutional capacity to continue technical assistance for production and transfer of recommendations.

4. Evaluation of Annual Crops Program

Through the conduct of the earlier cropping systems project the annual crops program made substantial progress in laying the groundwork for the current project. While basic research for individual crops and associated technologies

were continued, as necessary, much of the crops research efforts were re-oriented to the systems approach through various forms of cropping systems, mono-cropping, inter-cropping, relayed cropping and rotations. Staff members seem to have accepted the new approaches in an enthusiastic manner and conveyed this to country representatives and the institutional counterparts with whom they work. Training schools, short courses, graduate training and some university courses have been restructured to embrace the philosophy and methodology of the systems approach. And, of primary importance, is the experience gained in working with farmers on their farms in applied crops research.

With these, and related experiences, the Turrialba crops program staff and their associated representatives in C.A. countries were well prepared to initiate the current project without delay.

a. CATIE Annual Crop Program Objectives

These are rather well defined for the annual crops phase of this project. The primary objective of the staff is to further refine a systematic cropping systems research

methodology which may be adapted to different kinds of areas within the cooperating countries and which may be taught to their institutional research and extension workers. A second objective is to develop multiple cropping systems in the form of production alternatives (tech-packs) which may be applied by small farmers in their overall farming systems. A subsequent objective is to cooperate with animal production scientists in developing alternative mixed farming systems to combine crop and livestock enterprises into more productive and profitable overall farming systems for individual small farmers. A final objective is to develop a methodology for transference of validated production alternatives to neighboring farms in a given area and for extrapolating these into other similar areas.

b. Staffing for Annual Crops Program

Staffing by CATIE for this program consists of two components - - the central core staff at Turrialba and country representatives in the cooperating countries.

All professional CATIE/ROCAP staff members in the program devote 100% of their time to the SFPS project, a total of 13 currently. Seven of these are located at the central station at Turrialba while six are stationed as representatives in the six cooperating countries.

Other professional workers who work full-time on the cropping systems project are financed by other organizations - - 3 by the European Economic Community (CEE), and one by the International Development Research Center (CIID). Part-time work on the project also is contributed by professionals employed by other institutions - - the International Plant Protection Center (IPPC), the Overseas Development Agency (ODA), the International fund for Agricultural Development (FIDA), and the Technical Cooperation Society Ltd., the Federal Republic of Germany (GTZ).

In addition to the above, several resident members of the Turrialba CATIE staff - - who have teaching, research, and graduate training responsibilities - - also assist with the farming systems research on a part-time basis. Also, the cropping systems approach seems to be permeating the curriculum of teaching and training programs at all levels and the thesis research of most graduate students as well.

c. Procedures and Research Emphasis

Observations about the annual crops program were gained from individual and group conferences with members of the CATIE staff at Turrialba, from visits to research fields

at Turrialba and to research trials and tests on individual small farms, and from a review of publications and reports.

All annual crops research at Turrialba is now done on a cropping systems basis. While tillage methods, variety testing, insect and disease control, growth habits, etc., are investigated, they all are oriented toward relationships within overall cropping systems.

No work is done at Turrialba on testing and validating production alternatives (tech-packs). The farming system trials, tests, and validations of tech-packs are all conducted with small farmers on their farms in the cooperating countries.

- Research Methodology

A systematic procedure for conducting farming systems research has been developed by the CATIE staff and now serves as the pattern for all research activities. It involves a six-step procedure as follows:

Step 1 - AREA SELECTION - Selection of project areas within a country usually is based upon secondary data in cooperation with country institutions. Selection is based upon a number of factors from best sources available, such as the number of small farmers, ecological conditions, kinds of institutional support, the potential for transference and extrapolation, etc.

Step 2 - CHARACTERIZATION - This first involves a diagnostic survey of the area to gather data on production, farm sizes, family size, labor availability, employment opportunities, economic returns, etc.

This static phase of the characterization may be followed by preliminary work on project design and then, the dynamic phase is continued throughout the duration of the project to refine and update the initial data.

Step 3 - DESIGN ALTERNATIVES - This is somewhat of a synthetic process based upon the resources and system now followed by the farm cooperator, the appropriate crops research findings, and various other physical and economic factors, ascertained by members of the research staff.

Step 4 - EVALUATION - This step involves the implementation of the chosen alternative (techpack) with the farm cooperators on their farms (Perhaps on 5 to 15 farms in an area).

This is treated as a research trial, directed by the research staff, to test the performance of the alternative on the farmer's fields under his conditions.

Step 5 - VALIDATION - This process involves a repetition of the research trial but with managerial control largely in the hands of the farmer. The purpose is to check production performance under these conditions but, also, to identify problems and constraints which hinder application - - such as lack of markets, poor transportation, insect and disease damage, tillage and weed control problems, etc. Discovery of serious problems at this point may necessitate a repetition of steps 3, 4, and 5.

Step 6 - DIFFUSION - This follow-up step involves dissemination of the new production alternative to other similar farms in the area. (CATIE researchers feel that this step primarily is an extension function, and they are initiating plans to start training area extension workers during the validation stage by getting them personally involved in its conduct).

- - - -

Proposals are under consideration to add staff to CATIE to concentrate on developing and testing new, non-traditional diffusion techniques to reach large numbers of small farmers more quickly. According to the proposal, this would involve a 6-member staff as follows:

1) a Rural Development Specialist as Group Leader
2) a Communications Specialist
3) a Rural Sociologist or Anthropologist
4) to 6) three in-country workers in the 3 countries selected for pilot study areas.

Selection of professional staff members for this assignment, especially the group leader, is a crucial factor. The leader should be a mature individual with expertise both in diffusion techniques and practical extension applications, preferably at all organizational levels.

Step 7 - CONTINUATION - This new step is only in the conceptual stage and is not yet a part of the research process. The purpose would be to continue to observe the performance of a tech-pack over time and make needed adjustments as conditions change.

During the duration of the Cropping Systems Project, this methodology was conceptualized, refined and used to the point of confidence in its workability - - with the understanding that fine-tuning still will be needed over time.

In implementing the procedure, proceeding through steps 4 and 5 leads to a first-approximation alternative. If this reveals weaknesses or special problems, steps 3, 4, and possibly 5, may be repeated to arrive at a 2nd. approximation which again would need validating before recommending. In practice, the process might be repeated again.

Research Application - As earlier mentioned, development of production alternatives is carried out with farmers on their fields in each country. A country resident is employed by CATIE to assist in implementing the annual crops project in each country. He is assisted by the CATIE staff in programming, training, conducting workshops, and solving problems which arise. He may be assisted in-country by one or more CATIE local hire technicians, and works with personnel of one or more cooperating country institutions.

Visits were made by members of the evaluation team to four countries - - Costa Rica, Honduras, Nicaragua and Guatemala - - to confer with related institutional representatives and to personally observe the research applications on individual farms. Accomplishments to date and competence and dedication of staff members visited are commendable. Further details about incountry visits are included in Chapter V, Sections A, B, C, and D.

d. Progress Findings

As a result of the above activities and numerous other interviews and report reviews, members of the evaluation team concur in a number of findings relative to progress in implementing the project to date and in recommendations for future areas of emphasis and adjustments. Since major findings and recommendations are itemized in another section of this report, only supporting observations will be noted here.

First of all, team members were favorably impressed by the competence, dedication, and courtesy of members the CATIE staff, both in residence at Turrialba and within cooperating countries.

Methodology for the cropping systems approach for annual crops research, as explained in detail by various CATIE staff members in conference, seems logically conceived, systematically formulated, and quite workable with farmers under field conditions. We concur with the staff in the desirability of developing step 7 (continuation) in the procedure described earlier and in further refinements of the methodology as experience indicates the need.

Development of transference methodology - - both for diffusion within an area and for extrapolation to other geographic areas - - is very troublesome for professional members of the CATIE staff. This is true for several reasons. First of all, they lack confidence in their innovative ability to conceptualize, evaluate, and validate the "non-traditional transfer techniques" specified in the Project Paper - - a task which seems far beyond their realm of experience and highly specialized technical training in agronomy and related fields. They feel that the necessary "tooling up" for them to attempt this assignment without professional help from trained transference personnel would be a very inefficient use of their time and would divert

and dilute their efforts in their primary responsibilities for developing the required tech-packs for annual crops, animal production and mixed farming. However, they heartily agree with the urgent need for transference of proven technology to the small farmers within, and outside the area, and are willing to lend their assistance as needed. In fact, the annual crops staff already has initiated a very sound approach for diffusion of information within a project area. They are training extension workers in the area to assist personally with the validation stage of a new tech-pack by helping collect data from cooperating farmers and then assist in analyzing and interpreting results. This probably is by far the most effective way to train and motivate local extension workers to understand and help disseminate the new technologies to other farmers in the area. Team members were able to observe application of this methodology in an impressive way in both Nicaragua and Guatemala - - a method which should be a key factor in building a higher degree of stability and permanence in a longrun, on-going development program within areas in a country. Further comments and recommendations relative to this problem

are included elsewhere in this report.

Another part of the project assignment which is causing concern among the annual crop members of the CATIE staff, and the animal production people as well, is the requirement for developing tech-packs for mixed farming systems. Still more troublesome is to conceive a methodology for expanding the systems approach to embrace the whole-farm/whole family approach. Suggestions for initiating efforts toward this objective will be offered in a later section.

One administrative-type problem relates to the time requirement for submitting annual plans of work - now due, at least in preliminary form, by November 30. This timing creates a problem for several reasons. First, since harvesting and evaluation of the current year's crops are not yet completed, data are not available to guide next year's planning. In addition, December is a difficult time to get material assembled since many co-workers, particularly at the national level, arrange vacations and observe holidays during this period. Finally, in-country annual plans are not prepared until the January/February period, making it difficult for CATIE Country Representatives to coordinate their planning with that of national institutions.

5. Evaluation of Animal Production Program

Unlike the annual crops program, the Animal Production Program is starting new with the current project. Animal production staff at CATIE do recognize the importance of animal production on small farms in Central American countries in providing a source of protein for family nutrition and in improving their incomes. Almost all small farms have some type of animal enterprise and we were informed by CATIE animal production staff that a high proportion of total livestock production in Central America comes from low-income farming operations. This observation is supported by survey data in Guatemala.

In view of this situation, the Animal Production Program of CATIE has sought to develop production systems adapted to small farm conditions. It has expanded its actions to encompass the entire region and, by 1979, activities were being carried out in all countries of the Central America Isthmus. Further details of objectives, procedures and research emphasis, and progress will be discussed in order.

a. Program Objectives

The objective of the animal production program is to assist small farmers in improving productivity of their animal enterprises to provide better nutrition

for the farm family and to make a greater contribution to cash family income. An associated and supportive objective is to develop production systems, involving producing units or modules, to make fuller use of available resources - especially family labor, crop residues, improved pastures, stored silage and hay, and non-traditional feed supplies, such as perennial leguminous tree plants.

b. Procedures and Research Emphasis

Animal production scientists working on the project have conceptualized a systematic and logical research methodology for carrying out their animal production research activities. Steps in this process are presented in outline form.

Step 1 - AREA SELECTION - In-country study areas are selected on the basis of several factors, such as number and types of small farms in the area, prevalence of different types of livestock enterprises, types of pastures and feed available (now and potentially) and desires of local institutions. The latter often is the decisive factor.

Step 2 - CHARACTERIZATION - This is done through development of an area profile through a diagnostic survey to gather pertinent physical,

social and economic data from farmes in the area, along with associated data. One phase is to start getting record data from selected cooperating farmers in the area.

Step 3 - IDENTIFY NEEDS - This results from analysis of data from diagnostic surveys and from personal observations in the area.

Step 4 - DESIGN RESEARCH - The pattern for dairy research, which has received primary attention thus far, is to set up a production module covering all phases of the comlete production unit. This includes housing; improved pastures with rotation grazing; feed for the dry season; crop residues; and non-traditional feeds such as chopped banana stalks and perennial leguminous tree plants. Design of production modules for small animal enterprises is just getting started at Turrialba - with units for chickens, goats, pigs, and black-belly sheep.

Step 5 - IMPLEMENTATION RESEARCH - This phase, as indicated above, is initiated by first setting up a trial unit, or module, at Turrialba with testing and evaluation there before taking to

small farms where it later is evaluated and validated under small farmer management.

Step 6 - ADAPTATION AND PERFECTION - During this stage an appropriate adaptation of the module is established on a small farm as a research trial, with complete records being kept, supervised, and evaluated by the researcher through the first-year trial period. Records include data on milk production, reproduction, pasture and feed production, sales of products, operating expenses, etc.

Step 7 - ON FARM TESTS - These are a continuation of conducting the production module test with most of the production and managerial decisions made by the farmer. It involves a continuation of record collection and analysis as explained above.

Experience with steps 5, 6 and/or 7 may indicate the need for going back to step 4 with some redesigning to overcome problems, followed by working through steps 5, 6, and 7 again.

c. Progress Findings

Evaluation team members had opportunity to visit on-going dairy modules at Turrialba, as well as first year adaptations on small dairy farms in Costa Rica and Guatemala.

Two types of dairy modules are under test at Turrialba - a specialized dairy unit and a dual purpose unit.

In the specialized dairy system, cows are more highly bred for milk production (using Ayshire, Brown Swiss, and Zebu crosses); milking is done either once or twice per day with machine milking; only young female calves are raised artificially; calves are fed milk serum from a bucket, or are given milk substitutes; and cows are grazed in a rotation pasture system.

In the dual purpose system, cows are milked once a day and raise their calves until weaned. In this system, a common practice is to leave about a quarter of the mother's milk for the calf.

In addition to research modules at Turrialba, a specialized unit on a small farm (8 ha in size) was visited in Costa Rica. The farmer was quite enthused about his system which involved hand milking, electric

fences for his rotation grazing, a cooler for his milk stored in cans and daily pick-up of whole milk. All calves were sold early and replacement cows were purchased.

Team members also visited a new dairy research unit established by ICTA in the Nueva Concepcion area of Guatemala. The research unit is patterned after the double-purpose module at Turrialba and has made an excellent start during the first year. The total research unit includes 8 has. with 3 has. set aside for pasture for the dairy herd, consisting of 26 cows of producing age. The cows are cross bred, using Brown Swiss to cross with either Cebu or native Criollo cattle. Rotation grazing is a key feature of the system, using improved star grass pasture in 22 different units. Cows are milked by hand in an open milking parlor with concrete floor. Other research activities associated with the dairy system include a methane gas producing facility, using manure flushed from the milking parlor, and chopped silage stored in an underground pit-type silo.

Tests also were being conducted for Leucaena, a leguminous tree forage for dry-period cow feed.

The team also visited the farm of Luis Sagastume, located near the ICTA research station. He has adopted the dairy module established by ICTA on a somewhat larter scale. A service lane connects all of the 22 rotation pastures which are separated with electric fencing. He expcets to increase his herd to about 40 cows in this dairy system, now in the trial stage. While most efforts thus far by the Animal Production staff have been concentrated on the dairy production modules described above, they are initiating studies of small animal units at Turrialba. These are in the formative and exploratory stage since little prior work has been done to serve as a guide. Progress is underway in establishing modules for poultry, pigs, blackbelly sheep, and goats but no research results are available. A notable feature is initiation of cooperative efforts with the annual crops staff to investigate the potential for non-traditional feeds for these enterprises.

Evaluation team members were impressed by the competence of the Animal Production staff members and their enthusiasm for the systems approach. Their expertise is best with large animals. Specialized assistance in small animals would be helpful. They seem to do a very good job with their diagnostic

surveys of related project areas and in collecting follow-up records from selected small-farmer co-operators in the areas.

The Animal Production staff feels that transference procedures, both diffusion and extrapolation, will be somewhat easier for animal than for crop enterprises because of the lesser impact of physical variations.

6. Mixed Farming Systems Programs

Mixed farming systems as described in the Project Paper involve a combination of crop and livestock enterprises on the same farm. While developing a formal research methodology for developing mixed-farming tech-packs seems difficult for CATIE staff members to conceptualize and formulate, this kind of system is not a new phenomena. Most small farmers in C.A. practice mixed-farming systems. The problem seems to lie in developing mixed-farming tech-packs which crops and animals specialists feel confident in formulating, testing and recommending.

a. Program Objectives

The objective of developing mixed farming tech-packs is to orient their research efforts and

recommendations more in line with the task small farmers always have faced - how to put crop and livestock enterprises together in a more productive and profitable way.

From a scientific viewpoint, this is somewhat more complicated as more uncontrollable variables are involved and crop-animal relationships need to be explored in a more precise manner. Hopefully, some of these will be complementary relationships in which animal enterprises can utilize residues from crop enterprises (with zero opportunity cost), and at the same time may contribute to increased crop output.

b. Procedures and Research Emphasis

Research methodology for mixed farming systems has not yet been conceptualized and formulated by the CATIE staff. Some feel that individual crop and livestock tech-packs are not sufficiently developed to permit exploration of combinations - expecially for livestock enterprises for which less time has been available for development.

c. Progress Findings

In view of the stage of progress in designing mixed-farming systems, a different approach is suggested - primarily to give both crop and

animal technicians an opportunity to "think through" problems and processes of combining enterprises as a farmer must do - always with imperfect knowledge.

It is suggested that an initial effort be made soon, on a pilot basis, by selecting a small farm cooperator in a convenient location for a laboratory-like workshop. Crop and animal technicians would visit the farmer as a group and conceptualize two or more crop-livestock combination which seem workable to them and to the cooperating farmer. This may involve combinations of "proven crop and livestock tech-packs", if available. If not, enterprise selections and combinations would be made on the basis of collective best judgements of the entire group and the farmer - surely better than the farmer could do alone.

The resulting mixed system would be treated as an on-going case study with complete records of performance being kept from year to year. Since this would be in the nature of an experiment, some assurances to the farmer that he would suffer no losses in production and income because of his participation would be necessary. The expectation would be for him to benefit greatly.

The primary advantage of this combined approach would be to give specialists in various disciplines an

opportunity to gain a better understanding of both phases of the combined system and appreciation of the farmers task in putting enterprises together.

7. Complete Family Farming Systems Research Approach

One type of activity outlined in the Project Paper has received little consideration by CATIE staff to date. It is expressed in the project paper as follows:

> Using the experience gained to date, CATIE will expand its research efforts to incorporate a wider farming systems approach, i.e., a complex inter-dependent association of plants, animals, soils, labor, tools, and other inputs, all influenced by the ecological and socio-economic environment, and predominantly dependent upon the farmer's knowledge, ambitions, and abilities. - - - - thus, effective technological alternatives must be designed within the conceptual framework of a small farm, tested on-site and under the farmer's management, and evaluated in terms of appropriateness to the farmer's management, and evaluated in terms of appropriateness to the farmer's existing system, ease of understanding and adoption and increased income and employment generation.
>
> Farming systems methodology is a procedure for constructing area-specific farming systems recommendations. - - - - The proposed project expands this (the project 596-0064) methodology to include a complete farming research approach, i.e., take into account the physical environment, the socio-economic conditions, and the design of appropriate alternative sub-systems (including crops, animals, and mixed farming)

These excerpts from the Project Paper impose a difficult task at this stage of project development. Fortunately, a methodology (a systematic, step-by-step procedure) has been formulated for accomplishing the above task and used successfully for several decades in other

locations. It was conceived and evolved in Missouri over a period of many years and is the basis of a state-wide extension program (originally called Balanced Farming Systems, initiated in 1940). The procedure is adaptable to any size farm unit regardless of resources and financial conditions. It has formed, and continues to form, the basis for replanning and improving farming systems and family living on many thousands of Missouri farms.

The planning procedure referred to above has been adapted to extension programs in many other states, and in recent years, in other countries (e.g. Barbados). Plans are in progress to initiate the procedures in the Phillippines in connection with development programs of the Farm Systems Development Corporation. It is suggested that CATIE staff members consider initiating a pilot study to introduce this complete farming systems approach in 1981 so that it may evolve concurrently with other phases of the project over the next 3 years. This would involve selection of a typical small farm in a selected area, conveniently located, which could be used as a "practice farm" for staff orientation and involvement, as suggested in the previous section. With the cooperation of the selected farmer, and local professional staff, this

might be continued as an on-going experimental pilot study. Records would be kept of both production and economic performance as the system evolved over time. Similar pilot studies could be carried out in appropriate situations in cooperaing countries, as well.

A brief outline of the research methodology, and suggestions for a workshop-type shortcourse are included as Appendix A.

IV. Agricultural Research and Information Systems Program (PIADIC) -- Evaluation of Project Activities at San Jose and In Cooperating Countries. (Project No. 596-0048)

The current project is a continuation, with substantial modification, of an agricultural research and information systems program (PIADIC) which began in 1975. PIADIC is administered by the Interamerican Institute of Agricultural Sciences (IICA).

The first phase of this Project ended on March 31, 1979. The purpose of that phase, as stated in the Project Paper, was to forge a cooperative and coordinated effort by regional and national institutions in Central America to: (1) upgrade quality of research and orient it to needs of small farmers; and, (2) create a regionwide system for more effectively managing agricultural information.

The project first began with involvement of the five Central American countries (Guatemala, Honduras, Nicaragua, El Salvador, and Costa Rica). Soon after the project began, Panama requested to join. AID subsequently increased project support to include Panama.

A number of significant accomplishments were noted as a result of the Project's first phase, although some aspects moved more slowly than anticipated. Among those noted in

an end of project evaluation were the following:

1. National advisory committees were functioning (at the time of the evaluation) to some degree in all six countries, and work groups and task forces were operating in the regional institution. IICA's permanent information division, Centro Interamericano de Documentacion (CIDIA) planned for the PIADIC project extension and assumed administrative responsibility for it.

2. A set of manuals and guides were produced to deal with project activity, organization and technical support of national efforts called for in the Project Paper.

3. Informal training during organizational and activity planning with national institutions and a series of short, formal training programs on statistical methods and area frame sampling concepts and techniques have been presented.

4. A methodology for using tech-packs as specific recommendations for farmers was devised and five tech-packs were produced.

5. The area fram sampling technique as the basis for gathering rural data has been accepted among participating countries, and initial training of planners and technicians in principles of area frame sampling methods has been accomplished. The area frame has been completed in El Salvador.

Planned goals for development of a regional information system and establishment of a market news system were not realized during the project. The decision was made to place

priority emphasis on development of smoothly functioning national information systems rather than to push for a regional data bank. The idea of a regional data bank had met with some resistance from national governments because of feelings for national sovereignty when dealing with social data. Project managers also felt that the task of setting up a regional information system would be much more feasible when national systems are operating as planned.

Studies carried out in several of the participating countries revealed that farmers did not place as much importance on market news as, for example, they did on availability of transportation. Also, AID missions felt that this activity should be a bilateral operation. Consequently, work on developing a system to provide market news did not progress.

That end-of-project evaluation team concluded that the PIADIC project as originally conceived with simultaneous attention to a variety of activities was too ambitious, but recognized the strong interest in certain aspects of the project by participating countries. They also recognized that with a successful organizational effort on the part of IICA/CIDIA, a firm foundation for continuance of the project had been laid and something should be done to serve the needs of participating countries because their interest and enthusiasm for the project was high. There was concern that the project might be dropped.

That evaluation enumerated several other recommendations and conclusions that set the tone for specifying plans and activities for the continuation phase. Among those were:

1. The project was related to small farmers only from the standpoint that overall improvements in national information systems can permit governments to deal more effectively with small farm problems.

Disseminating information to small farmers was not addressed in the manuals and guides nor were technical staff trained or experienced in this activity.

2. It is through national information systems that the project purpose ultimately is achieved, and national systems must be functioning well before a regional system can really exist and fulfill its goals.

3. PIADIC awakened demand for technical assistance in gathering, storing and using data among all participating countries. The team predicted that demand would be high for assistance in establishing area frame sampling in the following year or two. Also, a common complaint of national planners was that PIADIC technical assistance personnel were not available often enough and for too short a period when they were available.

4. National and regional advisory committees had accepted the THERMATREX method of indexing research information, but this activity has not been given high priority in national

plans. However, the evaluation committee predicted little hesitation, based on discussion with those interviewed, among participating countries to exchange research information.

The team also concluded that PIADIC had played a useful role in: (1) providing a common conceptual framework (or at least the beginnings of one) that each country would adapt to its own needs and priorities, while at the same time preserving enough standardization to enable meaningful regional integration of information; (2) assuring communication on a regional level among country decision-makers and planners concerning information needs for decisions in agriculture; and (3) in providing technical assistance to national planners in the development of national information systems.

The current phase, or continuation, of the project (April 1, 1979 - June 30, 1981) is to improve collection, analysis, and use of relevant small farm data on which improved research and planning action can be taken nationally and regionally in Central America.

PIADIC is not designed to be an action program; rather it is to be a regionalized and readily available source of specialized technical assistance on methodology and experienced backup to country level research and investigation programs. By the end of the project extension (June, 1981), in-country programs are expected to have largely absorbed methodologies. Continued assistance is to be supplied by

IICA/CIDIA and/or ongoing USAID and other donor supported information development programs.

The project under the continuation phase was re-designed to complement and concentrate more closely on those activities that directly support agricultural research and related information needs. Those original elements not included in the new project paper for the extension included market news by mass media; also, plans for a regional data bank were postponed.

The main differences between the original project and the extension are that the continuance phase has a narrower, more specific focus, and greater flexibility is allowed in developing country and regional relationships under the project.

The present evaluation team has reviewed PIADIC plans and accomplishments in terms of scope, purpose, and planned outputs in the continuance phase. Through review of available documents and reports, interviews and observation, progress to date and plans for the near future have been determined.

A. Planned Outputs

Planned outputs for continuance of the project called for furnishing technical assistance to national and regional agencies as follows:

1. Development and refinement of area sample frame and use of information generated by it.
2. Assistance in development and use of key baseline data.
   a) Agricultural research and planning data bases.
   b) Area specific profiles and recommendations.
3. Establishment of specialized agricultural data and information centers.
4. Institutionalization of PIADIC into IICA, to include ability to provide continuing technical assistance to participating countries.

In July 1979, CIDIA underwent an administrative restructuring and PIADIC was integrated into its structure as one of three divisions. Early activities of the project centered around a campaign to launch the "new" PIADIC in each country. Project management was of the opinion that PIADIC must be integrated into IICA regular programming at the national level. Thus initial efforts were to explain project objectives and financing to IICA national directors. The efforts were successful, according to the project manager; and in December, 1979, at the IICA national directors annual planning meeting, the integration of the PIADIC project into IICA national programs was confirmed.

An additional change in the administrative structure of IICA, in January, 1980, involved CIDIA and the PIADIC project.

As part of an internal reorganization, PIADIC ceased to exist as one of the three divisions of CIDIA and became a project within CIDIA, prescribed to interact with all seven IICA lines of action.

B. Progress Findings.

There appears to be a constructive working relationship between ROCAP and PIADIC management. It seems to be an open relationship where, for example, PIADIC is kept informed of the state of the PASA budget and plays an active part in contracting technical assistance when needed. Increased participation of PIADIC management in these activities can strengthen their capabilities as overall project managers.

Annual work plans are viewed somewhat as busywork by PIADIC staff. A planning difficulty encountered by PIADIC staff in complying with the specific calendar of accomplishments called for in the Project Paper is that their activities depend on requests from users of their technology and services. It is difficult to forecast this demand accurately and plan a firm schedule to satisfy it. PIADIC staff would rather plan activities of concentration in the various countries, have an assigned budget for the work, and report on progress accordingly. In this respect, annual work plan documents have become smaller (fewer pages) in successive years. Staff members are writing them with less specificity. This appears

to be a realistic development.

PIADIC technical staff consider their budgets to be adequate. Problems mentioned relate to being somewhat restricted by line items with limited flexibility to adjust between lines. However, approval to make the necessary adjustments appears to have been forthcoming (for example, shifting money from an unfilled, full-time position to several part-time ones) so that potential budgetary constraints have been minimized.

Based on available information, it appears that IICA has provided at least 47 person-months fewer than called for by the project. Information was not provided to permit an exact accounting up to December 1. Except for two people added in August and September, 1980, the trend of unfilled positions seems to be continuing. In fact, the person-months of understaffing seems to be greater at present, with very little expectation for a change in trend.

At the beginning of the project extension, coordinating committees were listed for each of the six participating countries and for the region. The committee structure was designed to form a broad base of representation from institutions concerned with agricultural research, marketing, financing, production, and planning. The in-country committees were to serve as advisors to the PIADIC coordinator (a national professional) and the national PIADIC director (an IICA employee). Appointment and functioning of PIADIC national coordinating committees was difficult to achieve. The make-up of the

committees, as specified by the project, included individuals with marginal direct interest in PIADIC (in some cases, conflicting interests). Such inter-committee relationships tended to make the committees ineffective. However, at one time, all countries had committees, though functioning at various levels of effectiveness. We conclude that PIADIC staff time should not be dissipated in insisting on these committees being functional. If the countries themselves continue to support functioning committees this is well and good.

Work in countries by PIADIC staff generally is handled through the in-country IICA directors, PIADIC coordinators and PIADIC coordinating committees (where they are operational--Panama and Guatemala). PIADIC coordinators are assigned 50 percent in-country and 50 percent to the regional level. Regional level activities are assigned by the IICA project manager. This procedure appears to increase staff use efficiency while broadening breadth of experience of each coordinator.

The presence of a PIADIC national coordinating committee does not seem to be as important as the need to insure that those institutions interested in PIADIC are involved actively in the project. The fact that national coordinating committees are comprised differently, operating at various levels of effectiveness, or do not exist at all, should be a matter of little concern.

In some cases, the time frame of the project caused PIADIC to try to move faster than was realistic in selecting country institutions to conduct project activities. Thus, in the early stages, they were attempting to work with institutions which by the nature of their work and expressed interest were unsuited for the project. Therefore, in some cases, inappropriate selection of an institution and development of an unsatisfactory working relationship delayed progress on the project for a year or more.

IICA has been strengthened in computer facilities and capabilities to carry out provisions of the PIADIC project, and it has incorporated the use of these facilities to aid many internal management functions of IICA, e.g. financial reporting, breakdown of expenditures by activity, and control of budgets by line item.

At one time PIADIC activities were closely aligned with the rural development "line of action" within IICA, rather than the information "line of action", as at present. From our discussions, it was apparent that PIADIC does, in fact, interact with other IICA "lines of action." From the standpoint of meeting with project staffing requirements to have personnel in various lines, this results in efficiencies. However, from a managerial standpoint, conflicts often occur because the PIADIC manager must rely on people under line directors, and with diverse responsibilities.

None of the national information systems appear to have reached a stage of development necessary to produce the outputs for planners and agricultural researchers envisioned by the project. Some PIADIC staff estimate that a two-year continuance of the project beyond the current phase, which ends June 1981, will be required to fully institutionalize activities in national agencies in all countries. We conclude that even this estimate is optimistic. Each cooperating country is moving at a different rate; a modest level of support will be necessary over an extended period of time to fully meet the goals of the project. This support is not likely to come from IICA without financial assistance from ROCAP, USAID, or other outside sources.

1. OUTPUT 1 -- AREA FRAME SAMPLING

There is general agreement among staffs of ROCAP and PIADIC that the area frame sampling technique is economical and statistically sound for gathering specific information on crop production, socio-economic indicators, and other rural data. PIADIC has been responsible for providing technical assistance and training to national institutions on developing and improving sampling frames and related survey systems, and for using the data collected.

The person responsible for the area frame activity is Mr. Montie Wallace, who has achieved an impressive record of assistance to country institutions since the participating

project began the continuance phase on April 1, 1979. Wallace was assisted by Mr. R. Alvarado until August 1, 1980, when Mr. Alvarado resigned. The project proposal anticipated 39 person-months of input into this area by IICA. A major part of the deficiency in person-months of staffing IICA lies in area sampling frame activity. Mr. Alvarado has not been replaced and two IICA positions (one full-time and one near half-time) have not been staffed.

Accomplishments in this activity have necessarily depended on cooperating national agencies, which largely have been financed by the respective AID missions and national counterpart funds. One of the objectives from a regional point of view has been to establish a common methodology. Each country has its own area frame program, but progress has not been the same in all countries.

One point made in the evaluation of PIADIC accomplishment at the end of the first phase was "the most pressing need for technical assistance over the next year or two will probably be in area frame sampling." This warning seemingly was not heeded by IICA, for they have not to this date filled positions that nearly would have doubled technical assistance inputs for area frame sampling development. In addition, there do not appear to be any plans to fill a ROCAP funded full-time position which became vacant effective August 1, 1980.

Area frame methodology has been introduced in all

countries. Technicians have been trained in Guatemala (74), Honduras (32), Nicaragua (42), and Costa Rica (22). Surveys also have been conducted in all countries.

The national AID missions visited (Costa Rica, Nicaragua, Guatemala and Honduras) see the area frame sampling technique as a very worthwhile activity and are backing up this positive attitude with financial support. Mission directors suggest that the area frame activity stands a good chance of continuing beyond the PIADIC project period.

The general focus of activities of PIADIC seems to be where IICA wants it to be. There is general agreement that when the project ends, IICA will not have the ability to provide technical support necessary to service area frame development efforts in cooperating countries. Apparently, IICA believes that the countries will have the necessary capability. There is not strong evidence that the countries visited will have developed sufficiently to continue with area frame construction without additional technical assistance. There has been so much turnover of in-country personnel that (with the possible exception of Panama) people now serving are not the ones who helped introduce the area frame at the beginning of the project. The need for training is continuous. The PIADIC staff noted high turnover of national technicians; tenure averages under two years.*

Table I, constructed from information provided by

---

*Short-term technical assistance can continue to be provided by USDA on a paid basis (as it has during the project) if funds are available.

TABLE I. GENERAL TASKS AND ACTIVITIES AS PER CONTRACT IN OUTPUT I

(Development and Refinement of Area Sample Frame)

	Guatemala	El Salvador	Honduras	Nicaragua	Costa Rica	Panama	Regional	Status
Frame introduced	yes	yes	yes	yes	yes	yes	---	Complete
Training of at least 200 technicians	74	---	32	61	22	---		
Technical assistance	65 days	9 days	45 days	76 days	68 days	18 days		
National surveys or Pilot surveys	yes	yes	yes	yes	yes	yes	---	
Software packages for data management	yes					yes		
National counterpart	yes	yes	yes	yes	yes	yes		
Institutionalized	yes	yes	yes	yes	yes	yes		

IICA/CIDIA/PIADIC, outlines general tasks and activities as per the contract. It is worth noting that only two of the six countries currently have software packages for data management. Further, there is interest (in area frame development) in each of the countries visited, but there is not convincing evidence that national staff was sufficiently trained to continue without additional technical assistance.

In Honduras, the area visited has developed a profile without the use of area frame, although area frame was stated to be in use in other parts of the country. In Guatemala, national personnel had gained limited experience in area frame development, even though area frames for much of the country have been completed. This is because the work was carried out by three separate contractors. Thus, the responsible government agency did not develop internal staff capability. That agency (USPA) is taking steps to correct this deficiency.

2. OUTPUT 2a - AGRICULTURAL RESEARCH AND PLANNING DATA BASES.

The project plan calls for PIADIC to develop methodologies and offer assistance in data generation, processing, analysis, and summarization for use by researchers and other agricultural sector agencies. It was to place emphasis on standardization, normalization, and common site selection using natural production, biological and technical, and socio-economic determinants.

The responsibilities for the output of structuring

agricultural research and planning data bases is under the supervision of Mr. A. Garro and Dr. G. Paez. Mr. V. Quiroga, who was appointed chief of the Computer Center in January 1980, previously had overall responsibility for this output but now has only 40-50 percent of his time allocated to the activity. Mr. Garro, who has been on the job since June 1979, is responsible for natural and socio-economic determinants activities. Dr. Paez has been assigned responsibility for biological and technical determinants. IICA was unable to find a single international professional to provide the technical assistance for this activity area, so this position was converted to short-term PASA assistance. As part of this assistance, specialists have been contracted to install SAS (Statistical Analysis System) and CRIES (Comprehensive Resource Inventory and Evaluation System) software programs. Dr. R. Helms has assisted IICA in setting up the SAS program. Dr. W. Lodwick has assisted with installation for the CRIES software program.

Lodwick has written curriculum guides for the CRIES software and has conducted two-day seminars at IICA for both technicians and planners in which technicians from Guatemala, Honduras, Costa Rica, and El Salvador have participated. The training focused on showing what can be done at low cost and provided general training on the program vocabulary. Once the geographic data base information is available, computer overlays are made to rank areas for suitability for specific use. This information does not constitute an area profile because it does not include a socio-economic data base. Further, the

scale of current input information lends itself to needs of national planners, etc., but will not meet the needs of agricultural researchers who require more site-specific information. It is doubtful that this procedure has been institutionalized sufficiently in cooperating countries to continue after June 1981 without continued PIADIC support.

3. OUTPUT 2b -- AREA PROFILES

The specific activity called for in the Project Paper includes assisting national agencies in organizing and applying agricultural research and related information into area profiles using information gathered by the area frame and other surveys. By combining biological, socio-economic, and climatic factors, PIADIC was to develop "first approximation" small farmer recommendations (based on monocropping) that could be tested (two in each country) on farms by national agencies. They were to refine and introduce methodology that enables country researchers to compile, analyze and recall available data on already accomplished research.

Assignment of responsibility for this activity was spread among PIADIC coordinators working in each country (no person now is assigned to this activity in El Salvador because of the political situation) and 43 months of full-time PASA international technician assistance.

PIADIC technicians have been unable to fulfill much of

the needed assistance to national programs. This is because of a staff shortage, and the inability of the small staff to work in so many areas at the same time. They now try to work in a profile area in three-week stints. IICA staff positions in this output area were not filled until August, 1980.

The methodology calls for a general look at an area and determination of what data should be collected to meet envisioned needs. The staff feels that they have the prototype system they need for data analysis in the MSU-adapted CRIES package.

The technical competence of the national technicians when beginning work on area profiles is quite varied. Because of this variation and because of the high turnover of people, training must be a continuous process.

Overlap seems to exist between PIADIC and the ROCAP/CATIE SFPS in terms of development of area profiles and first approximation recommendations. PIADIC can collect information suitable for planning at a macro-level. This information can assist researchers in prioritying their research but cannot substitute for the research in making technical recommendations. While the methodology being used by PIADIC could be applied to a micro scale, CATIE staff doesn't feel that this is being done and that they must therefore initiate each study with a site-specific evaluation. We agree that currently available area profiles are of limited use to the CATIE SFPS program

but feel that, with continued refinement, the need of CATIE personnel eventually can be met. The two projects (PIADIC and SFPS) would have been much more complementary if the PIADIC project had preceded the SFPS program by several years. An additional complication which has reduced program interaction is that in most cases the projects are working with different in-country institutions and these reflect different geographic areas for their work. Each program thus of necessity works independently.

The PIADIC project manager feels that the project was miswritten in requiring them to construct alternative production recommendations. This may be a problem of poor communication between PIADIC and ROCAP. The first approximation is not considered to be a farmer recommendation, according to ROCAP. Rather, it is a description of parameters to guide researchers in selecting alternatives for further testing.

The inclusion of tech-pack requirements among PIADIC outputs may have cost the project some credibility. Expectations were that the "packs" produced would furnish data on which recommendations could be based. Because of the scale of the data, this has not been possible, at least to date.

We sensed a general staff concurrence that after the

current project, there will be little internal capability within IICA to continue the profile work. IICA does expect in the near future to install the ISIS (FAO/UNESCO) system to give the capability of searching agriculture research general topics. We were not able to determine the chances of this expectation being realized during the project period.

A country by country synopsis of present status follows:

a. GUATEMALA - - Work was delayed for about one year until responsibility was shifted from USPA to DIGESA. They have been working on profiles and first approximation recommendations at the same time. Two profiles were expected to be completed in December, 1980.

b. HONDURAS - - Area profiles are being constructed from available maps, but they may have to first try to improve the maps to do further work in profiling. In their first profile, they had to survey soils; and only limited secondary information was available. They did not use area frame but rather census data for the profile sample.

c. EL SALVADOR - - Original efforts in area profiling were lost when country strife halted activities. They are interested in completing profiles.

d. COSTA RICA - - Costa Rica completed a profile in Pacifico Sur. In 1979 PIADIC and CATIE did a small profile in Sav Isidro which included Tech-packs. SAS software is being used with the analysis done at IICA. The profiled area has also

been entered in CRIES and 11 maps of the area have been produced.

e. NICARAGUA--PIADIA is meeting in December to show the prototype profile using overlays on the grid so national technicians can profile on their own. They do not use SAS in country. Data processing is being carried out in country by Nicaraguan technicians using SAS at the IICA computer center.

f. PANAMA--Uses SAS software. Two areas currently are being profiled in cooperation with MAG and IDIAP.

4. OUTPUT 3 -- SPECIALIZED AGRICULTURAL AND INFORMATION CENTERS.

The intent of this activity was to help establish specialized national information and data centers and to assist in efforts to acquire, classify, store, recall, package, and disseminate national and worldwide information in a numerical and documented format for biological factors and production technology, market intelligence and socio-economic factors. By the end of the project extension (June, 1981), the project plans call for the national network of appropriate agencies in each country to use standardized methodologies for control, memory, analysis, interchange, and use of information relevant to researchers and planners.

Prescribed activities for the output include continued technical assistance by PIADIC staff, training of national counterparts, development of a national thesaurus of information

sources, and assisting the national information center staffs with interchange of information among national agencies, with other countries and with regional organizations.

Training efforts called for in this activity were to assist national PIADIC coordinators in their role and to develop capabilities among national agency staffs for establishing systematic standardized documentary and numerical data management, control, analysis and packaging of priority data bases for specific users.

There has been only limited development of data banks to date. Software for data bank analysis appeared to be in place at IICA, but data, particularly in the area of biological and technical determinants, appeared to be lacking.

Development of a thesaurus has been dependent on national interest to a great extent. PIADIC staff would rather not have had this requirement, but some progress has been made to develop them in institutions. A broad national thesaurus has not been developed in any country. They have an institutional thesaurus in Guatemala (DIGESA), Nicaragua (CENIT) Honduras, and Costa Rica (SEPSA). Panama will not have one and the situation in El Salvador could not be determined. The PIADIC staff feels that agricultural research is so broad that a thesaurus using key words cannot be developed.

Progress towards meeting general area outputs are

outlined in Table II, based on information provided by PIADIC staff. Training functions have progressed well. IICA capacity for data analysis is in place (not shown in the Table) and national systems are, in some cases, utilizing this capacity for data analysis. Several countries have developed data bank activities in cooperation with other institutions (e.g., Guatemala is using a data base structure similar to CRIES which was introduced by the University of Iowa for natural deterinants). The overall area of data base construction seems to fit well with IICA's interest in documentation and we perceived optimism on the part of IICA staff that this function would continue within IICA. The fact that this activity was totally incorporated into CIDIA in March, 1980, lends support to thie optimism.

5. OUTPUT 4 -- ADMINISTRATION AND COORDINATION

We interpret the Project Paper as calling for IICA, during the project period, to bring about a full institutionalization of PIADIC activities as integrated parts of its seven "lines of action." This could result in ability to provide continuing technical assistance to national and regional information programs. From the beginning of the PIADIC project, the intention was to develop a regional information system embodied in some regional data banks. IICA has the software capability for a regional data bank. However, major emphasis is on establishment of national information systems and on

TABLE II - - GENERAL TASKS AND ACTIVITIES AS PER CONTRACT FOR OUTPUT III,

Establishment of Specialized Agricultural Data and Information Centers

	Guatemala	El Salvador	Honduras	Nicaragua	Costa Rica	Panama	Regional
200 technicians trained	25	44	53	20	5	3	
Thesaurus developed	1st Edit.	--	1st. Edit.	1st. Edit.	--	--	
National network established	Plans written approved		Plans written approved	plans written		plans written	
Data interchange							
SDI seminars	yes 10 part.	yes 20 particip.	yes 15 part.	no	yes 125 part.	yes 15 part.	
Thermatres use	DIGESA	--	CEDIA	CENIT	no	no	
Publications support	yes Nat. Ag. Lib.		yes Nat. Ag. Lib.		Nat. Ag. Lib.		

standardization of methodology at national levels.

IICA is not likely to be able to carry on the level of technical assistance that will be needed to continue PIADIC activities after the ROCAP contract terminates. It is generally agreed that a staff of five or six full-time technicians is needed to continue. These would include specialists with capabilities in the following: (a) area frame development and use, (b) natural determinants, (c) socio-economic determinants, (d) agricultural technology, and (e) systems analysis. An additional person (an administrator) could be added to the list; however, if the activities were fully integrated into IICA "lines of action", such a person would not be needed.

There seems to have been a great deal of expectation built up in the cooperating countries for technical assistance in PIADIC activities. The countries will need a considerable amount of assistance and training to fully institutionalize these activities. IICA stands to lose considerable credability if such expectations are not met. It seems critical for IICA and ROCAP to insure that this capability is sustained in IICA. Further, based on the information available, IICA does appear to be the appropriate central American institution for providing the assistance envisioned in the Project Paper. IICA is regional in scope and has adequate facilities and experienced core staff. A long-time interest in documentation has been well demonstrated; IICA is the designated

regional center for the FAO AGRINTER system. However, IICA does not appear to have prepared for sustained outreach activities which will be required to fully achieve the goals of the project. Unless much of the staff currently funded by ROCAP funds, or an equivalent staff, is absorbed by PIADIC, much of the current level of activity will diminish at a time when several countries are reaching the point of effective utilization of PIADIC technical support. The extent to which ROCAP was remiss in not insisting on full IICA staffing during the project period could not be ascertained in this evaluation.

V. REPORTS OF IN-COUNTRY EVALUATION VISITS

Two or more evaluation team members visited each of four Central American countries during this assignment. During each visit, team members conferred with related institutional personnel, with CATIE/ROCAP country representatives, with local research and extension workers, and with individual small farmers on whose farms research trails and tests were in progress. Some of these were in the evaluation stage; others in the validation stage of development.

Separate reports of the observations, finding, and general recommendations for the four countries visited are included in the following sections.

A. COSTA RICA

1. SFPS Activities

Although CATIE is headquartered at Turrialba and has had a long relationship with the University of Costa Rica and the graduate program based in Turrialba, lack of participation of Costa Rican institutions in the SFPS project is a serious problem. It is more serious in Costa Rica than in any of the other cooperating countries. In our field visits (one to the higher rainfall eastern area and the other to the highlands area between San Jose and Turrialba) we noted a considerable amount of useful research work being carried out by CATIE personnel.

In the case of the high rainfall area, a considerable amount of this work is being carried out at the Los Diamantes Research Station in the testing of varieties of possible new crops for the region, including yams, pulses and yucca, as well as vegetables such as black pepper. This work appeared to be carried out primarily by CATIE personnel on land that had been allocated to them within the Station.

CATIE also is collaborating with Oregon State University in some interesting work being carried out on farmer's farms in the area. Presently six sites are being utilized to test variables in a potential tech-pack based upon minimum tillage practices. The variables being tested are weed control, insect control, variety performance

and fertilization levels. Crops include primarily corn and beans. This work is supervised by the Oregon State technician who is assisted by CATIE paraprofessionals. Some exciting preliminary results are being tested. These involve the control of insects under minimum tillage conditions through use of resistant varieties and integrated pest management which depends only minimally on chemical control.

Weed control activities also are based primarily on cultural practices rather than chemical control. In addition, some variety trials of forages for pastures are being carried out, as well as an on-farm test of composting under the supervision of a U.S. graduate student.

A cooperating farmer was visited in the highlands area between Turrialba and San Jose. This farmer had been able to purchase some land through an ITCO (the Costa Rican Colonization Agency), and had been receiving CATIE assistance for the last three years. His primary activity was a dairy operation with a milking facility patterned after the dairy module at Turrialba. He had seeded improved pasture to star grass and was practicing rotational grazing. Financial assistance had been received from ITCO, CATIE had provided without cost a number of investment

items including the milk cooling system.

This farmer also had three pigs he was fattening and was planning to keep one gilt for farrowing. He had no crop production and purchased all of his family food except for dairy products. This operation appeared to be highly successrul with satisfactory debt service and income for family living. Farm records were being kept and can be utilized for assisting the Costa Rican Extension Service and/or ITCO to replicate this dairy enterprise in other areas. The problem is, that there appears to be no active participation of either the National Extension Service or of ITCO personnel in the technical assistance being provided to this farmer.

Although it is true that several Costa Rican research extension staff had participated in shortcourses in Turrialba, there is little or no integration of CATIE, SFPS activities with Costa Rican cooperating institutions. Until this happens the impact of the SFPS project in Costa Rica will be limited.

2. PIADIC Activities

In Costa Rica, the PIADIC staff are working mainly with the extension service in the Ministry of Agriculture (MAG). However, other institutions are somewhat active - - DGEC, the census organization, and SEPSA, the agricultural planning institution.

There does not appear to be much direct linkage between the work of PIADIC and the Israeli systems being installed for conducting extension work. The framework does appear to exist if interagency linkages can be strengthened.

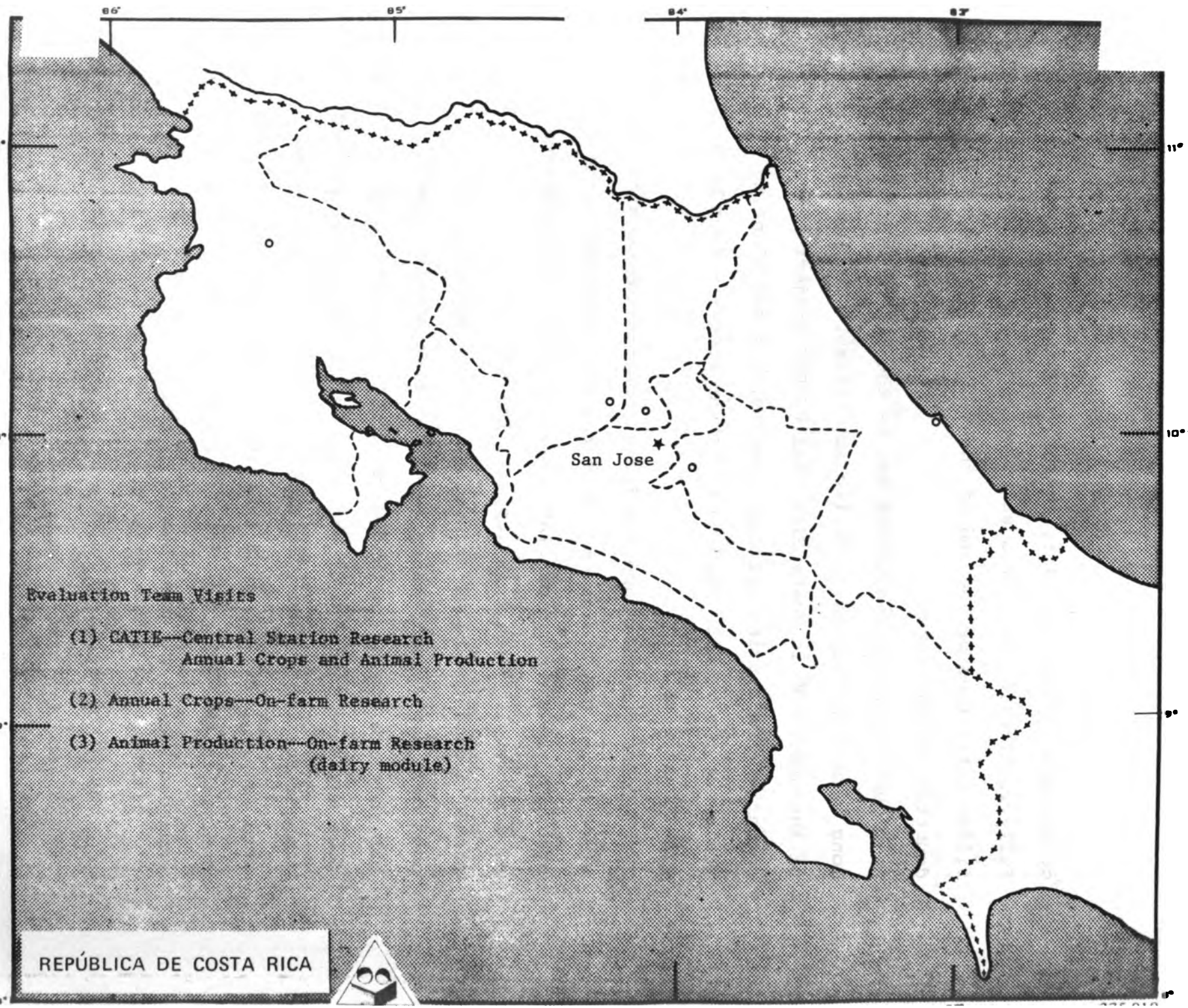
One real stumbling block for the PIADIC project in Costa Rica is that they do not have a PIADIC coordinator. This is delaying in-country coordination among agencies. One area profile has been constructed; in the Region of Pacifico Sur. The profile work has been done by the Centro Regional Pacifico Sur, MAG.

There is general agreement by ROCAP and PIADIC management that the PIADIC coordinating committee in Costa Rica is not functioning. However, the technician assisting with area profile work feels that the committee is as active as either of those in Panama or Guatemala. DGEC is not strong in its ability to handle socio-economic indicators in area profile work, but with continuing technical assistance and appointment of a national PIADIC

coordinator, this capability would be enhanced. Ability to fully institutionalize area sampling frame and area profiling activities by the end of the project period seem doubtful at this time.

USAID funding assistance may be the key in assuring long term viability of these two activities. In the opinion of the USAID/RDO in Costa Rica, the PIADIC project has potential for serving national institutions and planning goals but the results need to be forthcoming - - from both PIADIC and SFPS.

Funds for area sampling frame construction is provided by the USAID mission. This has been provided since prior to the creation of PIADIC, and probably will continue at some level. With this support, the area frame work stands a good chance of succeeding. Costa Rica has not conducted a national survey using the area sample frame, but they are moving in that direction. MAG apparently does not have funds to do the agricultural census originally planned for 1981. Thus, information collected through the area sample frame may be a substitute. USAID is not optimistic that they can furnish adequate funds for this expanded use of the area sample frame.



B. GUATEMALA

During the period November 27 to December 3, two members of the evaluation team (Fred Mann and Albert Hagan) visited on-going small farm research projects and conferred with institutional representatives in Guatemala. An earlier conference with Donald Kass, the SFPS country resident, on November 17 provided orientation for latter visits and conferences related to the SFPC project.

The purpose of this country report is to review the current status of the two projects in Guatemala, to summarize information obtained from conferences with institutional representatives, and to outline key observations, findings, and recommendations relative to the two projects.

1. SFPS Project

Team members were encouraged with several aspects of both the annual crops and animal production efforts. In both cases, the CATIE country representatives seem to have excellent rapport with ICTA (National Agricultural Research Institute) staff, with professional workers in related agencies, and with cooperating farmers.

A. ANNUAL CROPS RESEARCH

Good progress has been made in the selected project area of Chimaltenango in developing alternative cropping systems, partly because of the prior work done by ICTA over a period of years (since 1973) and of the preceding cropping systems project.

Cooperation between the CATIE representative, Donald Kass, and six ICTA technicians with whom he works, seems to be very productive. Each of the six ICTA agronomists who serves on a team with Dr. Kass, is in charge of one or two townships where he supervises farmers' trials and farmers' tests.

An economist organizes gathering farm record data through farm visits each week. The records from cooperating farmers include labor inputs, input costs, cash sales, etc. Each agronomist on the team is expected each crop year to supervise twenty on-farm trials on ten or more farms and to gather records from ten farm cooperators.

A visit was made by the evaluation team members to the Chimaltenango area to observe progress in annual crops production research. This area has natural advantages of excellent soils, favorable climatic conditions, good access to markets, and farmers who are receptive to change. Traditional crop production is "milpa," a combination (or associated) planting of corn and beans--primarily to assure the family food supply, with any surplus sold for cash. Many farmers also raise some vegetables for cash income. The primary research thrust has been to introduce new cropping combinations through various forms of multiple cropping, to generate additional

cash income: vegetable crops--such as potatoes, cauliflower, carrots, peas, guicoy (squash), cabbage, beets, broccoli, lentils, and, more recently, snow peas. Many excellent plantings of the latter were observed in the area.

In connection with these cropping patterns, various new technologies are under study--such as row spacings, plant population, type and sequencing of crops, varieties, fertilization, harvesting procedures, etc. Various techniques are in the process of evaluation and validation.

As an aid to marketing, a new cooperative vegetable marketing facility, sponsored and assisted by an USAID project, is now starting to function and was visited by the evaluation team.

While an area profile was not available when the crops work was initiated, PIADIC expects to complete one for the area in the near future. An ICTA team had carried out an area characterization study during the initiation of work in the area in 1973-74.

The research station in the Chimaltenango region also was visited. Work there is designed to further develop and test crop technologies which form components of the cropping systems being tried and tested on

individual farmers. One of the greatest constraints at the research station seems to be lack of adequate financing to acquire and provide logistical support to sufficient well-trained staff members to carry on the work and to maintain current operations. Travel funds for fuel and vehicle maintenance are especially constraining. In fact, if it were not for SFPS project funds being made available for fuel purchases, the level of farmer trials and tests in the area would be severely curtailed.

In summary, the annual crops program in Guatemala seems to be well integrated and coordinated with the national ICTA program, and seems to be making practical and useful contributions to food production efforts, given the resources available. The greatest constraint to expanding the work to new areas seems to be the lack of adequate financial support for ICTA by the national government, either from internal or external resources.

B. ANIMAL PRODUCTION RESEARCH

The CATIE/ROCAP animal production research in Guatemala, in cooperation with ICTA, is much newer and is just now getting underway. Two areas have been selected for initial efforts--the Tactic area at higher altitudes and the Nueva Concepcion area in the coastal region. Selection of the study areas primarily was a joint effort by CATIE and ICTA personnel but political considerations

also had influence. Since the country has a severe deficiency in milk production, both study areas selected offered opportunity for expanding the output of dairy products.

(1) Tactic Area

This area was not selected by the country representative for the evaluation team to visit. The Tactic area is about 200 miles north of Guatemala City, and at an altitude of 1,600 to 1,800 meters. Dr. Ernesto Huertas (a CATIE/IDB employee) and Romero Solano (ICTA staff member) provided factual data about the area. Physical and climatic conditions are favorable for supporting the dairy enterprises being emphasized. The temperate conditions, with only a short dry season, are favorable for pasture production.

The primary research thrust is development of improved pastures to support an expansion in milk production. From an initial area characterization completed with the help of Marcelino Avila from CATIE, 20 local dairymen were selected (from those who volunteered) for keeping records of their present dairy enterprises. From these 20 cooperators, one or more dairymen will be selected for on-farm trials and follow-up tests.

Since land is poor and much is unsuited for crop production, both the farms and the dairy herds are

larger in the Tactic than in the coastal area. Farm sizes range from 50 to 100 hectares and the dairy herds vary from 10 to 40 cows, largely dependent upon pasture available. Dairy processing facilities are available to a cooperative of 180 dairymen in the area, but poor roads to individual farms are a major problem.

To date, ICTA has lacked resources for establishing a research station in the TacTic area, so all CATIE research work is conducted on local farms.

(2) Nueva Concepcion Area

Evaluation team members visited this area on the south coast with Dr. Ernesto Huertas and Romero Solano. Both the new research station (established in June, 1979) and a local cooperating farmer were visited to observe on-going research efforts.

Conditions in Nueva Concepcion are quite different from those in TacTic. The land is flat and the elevation is low. The monsoon-type climate is characterized by high temperatures and six months of heavy rain, followed by six months virtually without rain.

This area originally was settled about 25 years ago in connection with a colonization project. It included 1,700 20-hectare parcels and 500 1 to 10-hectare

rental units. Dairy production is a major enterprise in the area and milk marketing services are available.

Interesting and potentially useful research work was initiated quickly in this area. As a part of an area characterization study, a rather large number of local diarymen volunteered to cooperate. From this group, 20 were selected as record keepers. Production and some financial records are collected from them each month to get a better understanding of prevailing dairy enterprises. Starting in May of 1980, one local farmer, Luis Sagastume, has been developing the recommended dairy module for an on-farm trial.

- The Experiment Station. The central effort at the experiment station is establishment of a dairy module unit patterned after the module developed at Turrialba. The station includes a total of 8 hectares of land with 3 hectares devoted to the dairy module. The unit now includes 26 cows of producing age, consisting either of Brown Swiss or crosses of Brown Swiss with zebu, and/or the local criollo cattle. Primary emphasis is on increasing pasture productivity through rotation grazing; use of new varieties such as Star grass; introduction of legume crops, such as the tree legume, leucaena; time

of cutting; plant spacing; and silage and hay making. Facilities for the herd include an open milking parlor with a concrete floor and gutter leading into a methane gas digester, just newly constructed.

The 3 hectare pasture area for the herd is separated with electric fencing into 22 different plots used for rotation grazing; with Star grass as the primary forage. For supplementary forage during the dry season, studies are under way for silage and hay making, utilizing crop residues, new drought-resistant crop varieties, and providing irrigation.

- The Farm Trial. The cooperating farmer, Luis Sagastume, is duplicating the experiment station dairy module on a larger scale with 8 hectares, rather than 3 hectares,divided into 22 plots for rotational grazing. His herd now includes 20 cows, with plans to expand to 40 to 50 in the future. About 1 hectare of land is used for producing sugar cane and buffalo grass for dry season forage. The remainder of his 20-hectare unit is used for cash crops, primarily corn.

Luis is an innovative individual and, pretty much on his own initiative, is developing plans for what we might consider a "mixed farming" or "whole-farm-systems"

approach. He already has experimented with tomatoes on his cash cropping area (usually devoted to corn) and has plans to try other cash crops. He also has developed a confinement poultry enterprise with 100 laying hens. He recently constructed a new home for his family of four (two young daughters).

As a part of SFPS project cooperation, he is assisted in keeping detailed records of his operation--including herd health and production records, sales, physical inputs, including labor, and costs of production.

- Summary

The animal production program in Guatemala seems to be making good progress--in view of the resources available and the short time in development. Cooperation between CATIE and ICTA is satisfactory and the efforts in both project areas are appropriate, with good potential for widespread adoption of technologies which prove to be workable and profitable.

Partly because of local political pressure, only dairy (actually dual-purpose) cattle enterprises are included thus far, with no attention either to small animal enterprises or to mixed farming and to the whole-farm systems approach envisioned for this project.

Such developments may follow and, in fact, already are in practice on individual farms (as indicated above). But this may be a case where the researchers need to "catch up" with the farmers with whom they work.

Key problems which appear to hinder more rapid development are:

1. Poor roads--lack of access to many farms;
2. economic returns to cattle enterprises may be relatively low under present technology;
3. ICTA lacks adequate financing to support research;
4. lack of extension staff and know-how to follow up and extend findings; and,
5. too frequent staff turnover, both technical and administrative.

These, among other problems, will need attention in extending the program through the next three years.

2. PIADIC Activities

A. Area Sample Frame

The agricultural sector planning unit of the Ministry of Agriculture (USPA) is responsible in Guatemala for carrying out the area sample frame activity. Area sample frames are being constructed to permit valid data at the regional level. Guatemala is divided into eight regions. Region I has been constructed. Three more regions are expected to be completed in February, 1981, and two other regions are getting under way. Construction of the area sample frame segments for these regions has been funded primarily by USAID Guatemala under a loan to the Guatemalan government. The segments have been constructed by contracting to a private individual and he has been responsible for contracting the other personnel. To date, three different contracts have been let. As a result there has been little continuity in terms of acquiring expertise in sample frame segment construction and in installing this capability within USPA. USPA feels it does not presently have the capability to continue this activity without continuing technical assistance from some source. Neither do they have funding available for completing the area sample frame for the rest of the country without continuing support from USAID Guatemala. A survey has been carried

out for Region I for testing purposes and a second definitive survey is to be carried out soon.

B. Information Systems

Guatemala has done a considerable amount of work in organizing itself to develop an information system. The system is called SNIAG (National Service For Agricultural and Livestock Information). This information system is divided into two subsystems, one coordinated by the national director general of statistics in the Ministry of Economy, and the latter by USPA in the Ministry of Agriculture. The former is a numerical information system which is computerized, while the latter is a documentary information system.

The plan for the documentary information system is to have a network of specialized centers at each major agricultural sector institution. USPA has been working at trying to sell this idea to various institutions since January of 1980. They initiated their efforts with a questionnaire to the institutions to determine their involvement. Thereafter and, with PIADIC assistance, they held a short course for documentary information systems. Twenty persons attended this two-week course.

In Guatemala the coordinating committee for agricultural information systems seems to be functioning better than in any of the other countries which we visited. It develops policies related to the establishment of information systems and

is seeking budgetary assistance. To date, the cooperating institutions have found it necessary to simply borrow from existing internal capacity to carry out their work. There is a plan to introduce legislation in the coming year to formalize the structure of the agricultural information system and to have a specific budget assigned to it. Unless and until this is done, it is not likely that the agricultural information system will be able to progress effectively.

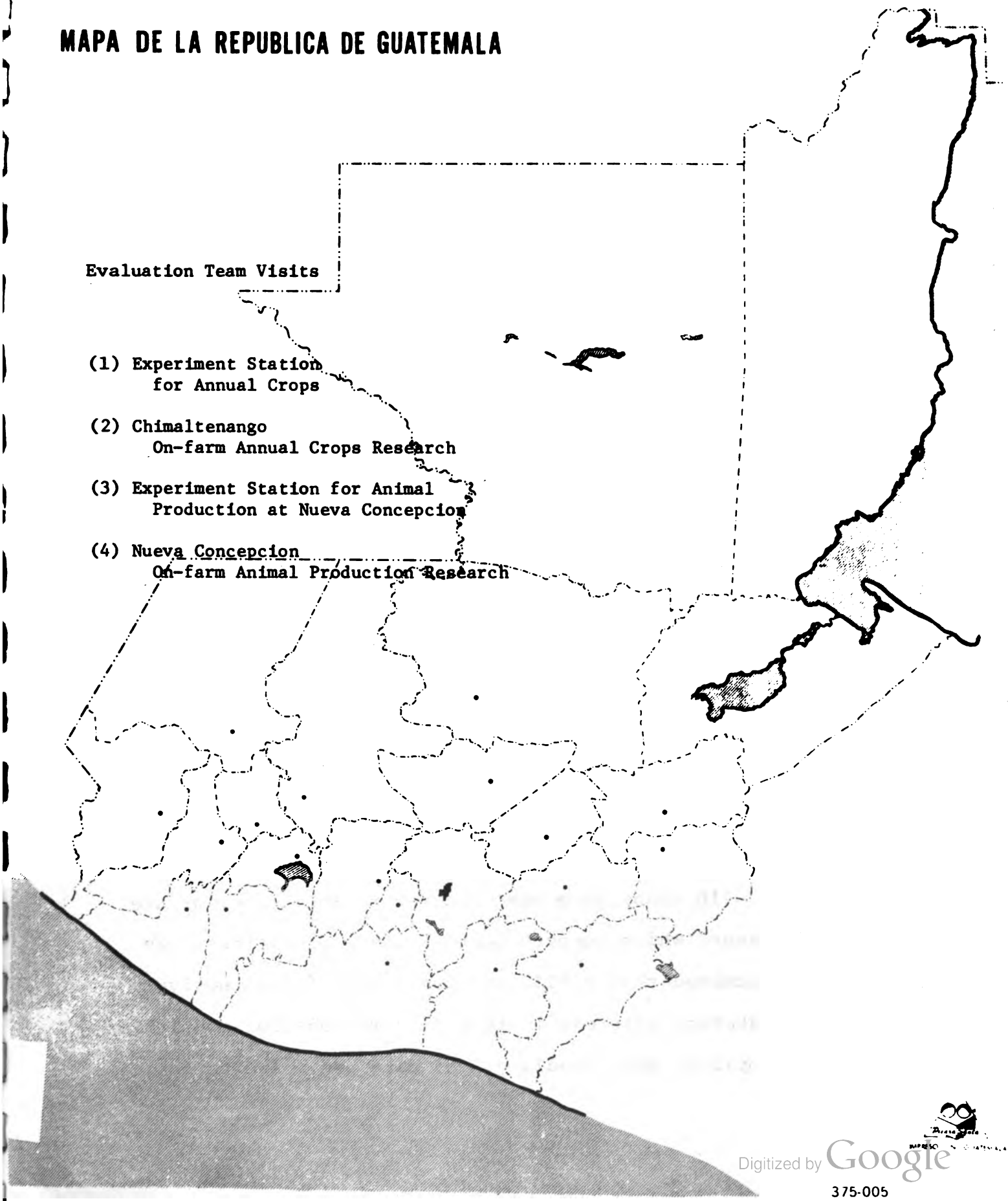
C. Area Profile

DIGESA which is the General Agricultural Directorate of the Ministry of Agriculture, has been responsible for carrying out the area profiles. This responsibility has been assigned to the Office of Agricultural Education and Training (DECA) of DIGESA. Data has been collected for two profiles, one in Quezaltenango and the other in Chimalenango. Farm level data was collected for four crops: cabbage, potatoes, strawberries and peaches. Four farmers for each crop were interviewed. These four farmers were selected for being good farmers in raising the particular crops. In addition, a random sample of another 225 farmers were selected and surveyed. This data was being tabulated at the time of this evaluation and was expected to be ready by mid-December, 1980. The farm level survey data was to be

combined with general data avilable from secondary sources about the areas and an area profile report prepared.

DECA feels that it now has the capability to carry out area profiles if and when funding is available. The expectation is to do up to six of these area profiles in the northern zone of the country between the large undeveloped PETEN department and the highland areas (Frnaja Transversal).

MAPA DE LA REPUBLICA DE GUATEMALA



C. HONDURAS

Team members Don Esslinger and Harry Minor visited Honduras during November 26-28 to review CATIE and PIADIC programs there. The interview schedule had been arranged by Nancy Fong (ROCAP - Guatemala City), who accompanied on all visits. The basic schedule was to visit USAID in Tegucigalpa on the morning of November 26 and CATIE programs in Comayagua in the afternoon; the CATIE small farming systems program in La Esperanza on November 27; and the PIADIC area profile program in San Pedro Sula on November 28.

1. USAID - Tegucigalpa

An interview with William H. Janssen, RDO, had been scheduled. Additionally, independent interviews with David Johnston (Management of AID Loans/Planning) and Charles Oberbeck (Research) were possible on an impromptu basis. From the discussions held, we developed the following as an overview of AID appraisal of CATIE and PIADIC impact in Honduras.

CATIE and PIADIC programs have been useful to Honduras.

AID loans have been made, were available, or are planned which support most of their activities. We perceived that PIADIC was due credit for effectively awakening interest in improving methods for population sampling, data handling, and data use. Two persons

were being trained to the M.S. level in the use of the area sample frame. AID loan money was made available for purchase of a mini-computer. Meetings with Secretary of Natural Resources personnel (detailed later) clarified the type of efforts currently underway. To appraise these efforts and to place national level activities in perspective, it was pointed out that national priorities have not been fully redefined since changes in government which have occurred during the past year. Further, many of the activities within the scope of CATIE and PIADIC programs are planned and acted upon at the regional rather than national level. Thus, decentralization is a prominent feature of research and extension programs over which national coordination is weak, even though funding allocations are largely made at the national level.

The above situation has two consequences: first, decentralization buffers regional programs somewhat from political change so that they have, in general, been less affected by governmental transition than has the central government itself; and, second, the persons to whom PIADIC successfully "sold" their

program at a national level are no longer in office. Program continuity and nationalization of PIADIC's methodology will, therefore, require that much of the educational process be repeated. AID staff pointed out that things are happening, but slowly - - if the seeds planted can be kept growing, the program may be operational in as little as five years.

Basic grain production is being encouraged on medium to large sized farms. The concept that the small farmer can improve his condition through employment of better practices for grain production is being questioned. A minimum farm size for earning a living with subsistence crops was stated to be 10-15 hectares. A smaller farmer can only experience a marked improvement in income by shifting (at least in part) to higher value crops.

CATIE program efforts to improve the livelihood of small farmers focuses largely on basic food grains - corn, beans, and grain sorghum. The inclusion of these crops in rotation with potatoes (in La Esperanza) and efforts to inter-crop them with high value food crops such as carrots and onions have a high potential for making an impact on the incomes and quality of life of small farmers. Other cash crops should also be considered as crop alternatives. We were shown flax cut from an experimental planting. Other oil-

seed crops may merit attention, especially in Comayagua, since many such crops are adapted to low rainfall situations.

The image of the CATIE technicians in the field is excellent. The Honduras research organization appears to be receptive to assistance with development of cropping alternatives but is reacting negatively to on-farm work. Considering the current status of information on cropping systems in the country, this reaction is probably the result of a need to conduct experiments under more carefully controlled conditions which will produce publishable findings.

Reaction to CATIE technicians in the field has been highly favorable. The near unanimity of response reenforces our belief that the CATIE "home staff" is highly qualified and capable of good work when permitted to function as researchers.

2. COMAYAGUA

Nicolas Mateo initiated his assignment as CATIE small farm production systems (annual crops) representative in Honduras in late 1979. Both Dr. Mateo and his predecessor had Comayagua as their headquarters.

Enrique la Hoz Brito also began work at Comayagua in late 1979 as a CATIE representative in charge of animal production systems in Honduras.
Both CATIE representatives have active programs on the SRN (Secretary of Natural Resources) station at Comayagua, or in surrounding areas. Dr. Mateo conducts his work in this area without a formal counterpart, but with the assistance of trainees in the in-service training program of the Centro Universitaria Regional del Litoral Atlantico. At the time of our visit, he was advising 3 students in their research which was related to Small Farm Production system program objectives.
Dr. la Hoz works closely with Mario Alvarado, his designated counterpart. Projects of the animal production program were visited in the field in the Camayagua area. A farmer survey (60 farmers) was among the first activities of the animal production program. Results of the survey, knowledge of the zone and its problems, and personal experience of Dr. la Hoz formed the basis for research initiated in 1980. Of 12 studies

planned, 9 were started by the date of our visit (November 26). Of these, we were able to visit 5. These were:

a. - Evaluation of rotational management of "Jaragua" and "Estrella" pastures and its effect on milk production.

This study, which included variable grazing pressure and frequency of rotation, had been irrigated to maintain it until the dry period. Irrigation facilities for pasture areas are not common in the area and this practice was used only to get the study underway.

b. - Use of sugarcane to replace "quatera" (drilled corn or sorghum) as a forage during the dry season.

Sugarcane and corn had been established in adjacent plots to compare productivity of the two crops as dry season forage sources. Many cattlemen in the area drive their livestock to to the mountains to find forage during the dry season. Shortage of forage during this period reduces reproduction and growth rate, and forces the early sale of young cattle. Sugarcane has the potential of serving as a forage

source (as compared to thickly planted corn or sorghum) and an eventual cash crop.

c. - Corn silage as a summer season "guatera" substitute for dairy cows.

Corn had been grown during the rainy season, chopped, and buried in a trench silo. The cooperating farmer planted "guatera" for dry season forage and was programmed to compare milk production from the two feed sources. CATIE technicians had grown the corn, dug the trench silo, and prepared the silage. All costs were being recorded under both systems.

d. - Evaluation of forage legumes in the area of Comayagua.

Non-replicated plots of Phaseolus atroporpurus, Dolichos lablab, Leucaena Leucocephala, Centrosema pubescens, Cajanus cajan, and Phoseolus lathyroides had been established and were being observed for forage production potential. Several had been cut and were making regrowth. Only one (Dolichos lablab), in our judgement, appeared to have growth and forage characteristics to make it attractive as a forage in the area. Others were making slow growth, were obviously susceptible to diseases, or were too coarse to make good feed. This test represents a useful activity and is appropriate in an animal production program.

e. - Effect of supplemental mineral salts on the reproductive capacity of cattle.

A covered salt box had been built and was accessible to one group of cattle. A similar group was deprived of the salt, but given otherwise similar treatment. Records were kept on a chart near the cooperator's door. Given the conditions, this test was well conducted.

For the work viewed and conversations with technicians involved, several observations can be made. First, the work all appeared to be well focussed, practical in nature, and carried out under appropriate (farmer or farm land) conditions. We saw no sophistication which might limit the direct application of new practices, should their usefulness be satisfactorily demonstrated.

The CATIE in-country animal production representative was quite enthusiastic about his work and appeared to be an excellent communicator. He had developed a good counterpart relationship, although we questioned whether responsibility at all levels was being appropriately shared. We feel that the CATIE representative should make every effort to leave a fully trained counterpart to assume his

role at the end of the project. To accomplish this, he must begin early to share responsibility with his counterpart and be willing to let that person represent the program whenever and wherever possible. He should shift from his role as a planner/coordinator to a co-worker and finally an advisor/observer as rapidly as possible.

Farmer input into the work was minimal. Farmers had furnished land and a questionable amount of labor but the other inputs were being paid for by CATIE. The feeling was that it was necessary to gain the farmer's confidence before they could be expected to make any substantial commitment to the new practices. We do not disagree, but we do feel that close farmer involvement is essential(and with some effort can be achieved) if successful new practices are to be rapidly adopted and transferred.

Work with dry season forages is providing a vehicle for mixed cropping research. In these studies, annual crops expertise is contributing on the side of forage production while animal science skills are concentrated on quality evaluations and utilization.

3. LA ESPERANZA

La Esperanza is a high elevation location (1200-1700m) where potatoes are an important crop. Most of the annual crops research conducted during the past year has been on the recently established experiment station of the Secretary of Natural Resources. This station has a staff of seven agronomists, four of whom we met. Dr. Mateo works as part of this group. The program of the station and CATIE appeared to be fully integrated, with no real distinction of what was being done by whom.

The climatic conditions of La Esperanza permit year-round production of potatoes, but rapid disease build-up forces the use of a rotation. While potatoes are grown with the use of substantial inputs, they are rotated with corn and beans which receive traditional management.

Because of the importance of potatoes and their profitability, the minimum length of rotation was being determined. Currently, potatoes are usually grown on the land only once every four years. Recent results suggest that the interval between potatoe crops can be decreased.

Potatoes receive a standard application of 1414 kg/ha of 12-24-12. Levels of the individual elements were being studied to determine whether or not these levels were in fact the most appropriate for the potatoe

crop and subsequent cereals. The initial result (first year) suggested that yield might be increased by higher application rates of at least phosphorus. Residual responses of corn were being evaluated at the time of our visit.

Potatoes receive frequent applications of fungicide to control Phytophthora infestans. Dithane M-45 has been used traditionally. In a test including several products, a systemic fungicide was identified which required less frequent applications and greatly increased profits (We were told that in its first use, profits were increased by $US 1000.00/ha).

Ways to improve production of the corn and beans grown in rotation with potatoes were being explored. In addition to studies of interaction between corn and bean varieties and fertility levels the possibility of intercropping corn and beans with vegetable crops was being explored. We are impressed that this system does offer a means by which the farmer can markedly increase his cash income from a small plot while still producing his subsistence crops. This work is timely because a new highway is expected to pass through the area within two years, greatly expanding the potential markets for produce from the region.

Numerous other studies involving, in some instances, new crops (e.g. flax) were in progress. Some work was underway on farmer's fields, but the concentrated effort to this point has been on the experiment station.

A planning session had been held the week prior to our visit which included the local extension staff. Next season's program will include extensive on-farm work in which both research and extension staff will cooperate.

Again, we perceived an energetic staff conducting practical, applied research with potential for a rapid impact on the area's agriculture. Cooperative efforts between research and extension were clearly in-the-mill and should greatly accelerate transfer of information to growers. The CATIE representative (Dr. Mateo) has developed a good working relationship with national staff. Overall, we viewed the efforts at this location as having an excellent potential for making a worth-while contribution.

The only word of caution we would like to offer relates to the preliminary nature of most results available. Confidence which can be placed in them will increase with repetition across years. Because practices based on these one-year results are to be taken to the

farmers' fields almost immediately, some failure must be anticipated. Farmers should be alerted to this possibility so that expectations are not unduly high.

4. SAN PEDRO SULA

Carlos Alvarez, PIADIC coordinator in Honduras, had arranged for a review of area profile development work being done by personnel of the Secretariat of Natural Resources in San Pedro Sula. The area being studied encompassed valleys in the "municipios" of Sulaco, Victoria, Yoritos and Yoro It was stated to be an area of good soils but with limited development to date.

Data had been collected on natural determinants of production, biological and technical determinants, and socio-economic factors. Prior to a survey which included a total of 580 homes in the whole area, the valleys were visited and secondary information collected. Included among these latter sources was census information from 1961 and 1974. Homes sampled in survey were determined from the most recent census. PIADIC provided training support, assisted with development of census forms, and defrayed approximately 25% of the cost incurred.

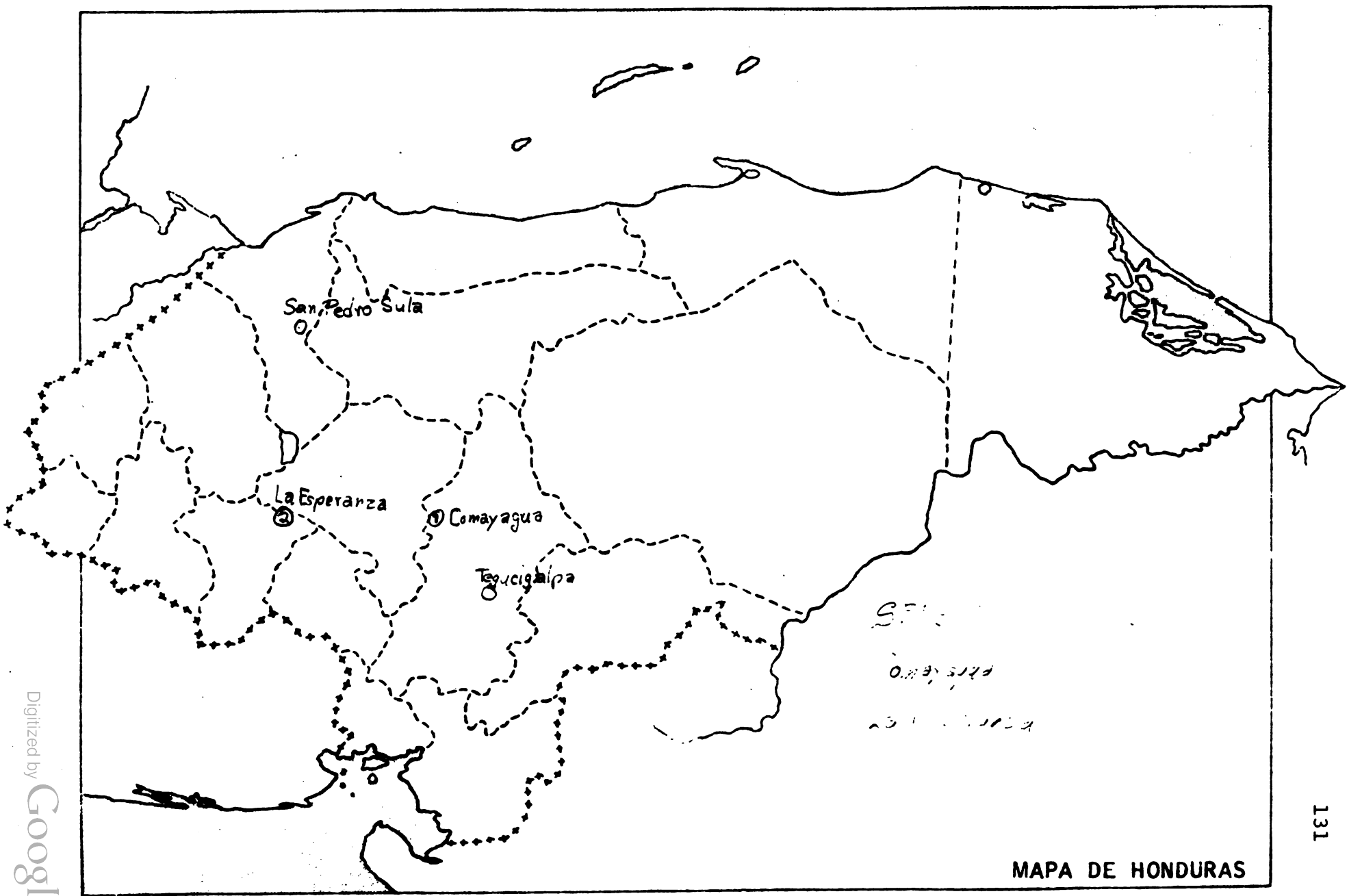
The area profile for the valley in Sulaco was largely completed and those for Victoria and Yorito were stated to be 45% complete. Information developed via the profile was being used to suggest alternative land uses and as a basis for assistance proposals. Apparently, a letter of intent had already been signed with the Swiss government for development of the Yoro Valley. A proposal which included an

irrigation project for 1500 hectares was almost ready for presentation to bilateral agencies.

Details about the valleys covered by the area profile seemed less important to us than capabilities of the staff and attainment of PIADIC goals. The staff was energetic and feel they have the technical capabilities to carry out studies of socio-economic factors without further assistance. Outside support is still needed to develop data on determinants of production and biological and technical factors. The staff is obviously spread thin, however, since work on the profile has been at a near standstill for the past few months while a regional plan for 1981 is being developed.

Area frame was not used as a sampling technique in the efforts described, although it was stated to be in use in other parts of the country. Data collection, however, did not appear to be the factor which most limited development of the area profiled - hand tabulation of the results has slowed putting the information into a useful form. Access to computer facilities is being negotiated and will, in our opinion, be necessary for effective and efficient utilization of the data available.

Our overall impression was that IICA had provided substantial support to the Secretary of Natural Resources during development of the area profiles. Indications were that the relationship would continue after the end of the PIADIC project.



MAPA DE HONDURAS

D. NICARAGUA

During the period November 23 to November 26, 1980, two members of the evaluation team, Dr. Fred Mann and Dr. Albert Hagen, visited on-going small farm research projects and conferred with country representatives of PIADIC and CATIE as well as representatives of cooperating institutions in both the SFPS and the PIADIC projects.

1. SFPS ACTIVITIES

CATIE and the Ministry of Agricultural Development (MIDA) through the Nicaraguan Institute of Agricultural Technology (INTA) have been collaborating in agricultural research since 1976. In March, 1978, Nicaragua officially joined CATIE as a member country. At the end of 1978, the CATIE had to leave Nicaragua because of the civil war, although visits continued and the work continued on a reduced scale. In April, 1979, CATIE and INTA entered into an agreement to co-laborate in carrying out small farm production systems (SFPS) research. This agreement was reaffirmed by the Minister of MIDA in June of 1980.

The collaborative agreement between CATIE and MIDA has as its objective the following:

1. Increase small farmer incomes and productivity.
2. Improve living standards and diet of small farmers whether they operate their land individually or collectively.
2. Seek alternatives for diversification and output of agricultural products for the domestic market as well as for export.

Specific goals of this agreement are in accord with those specified in the ROCAP/CATIE agreement in all respects:

-- Develop methodology of SFPS research and apply to four areas of Nicaragua.

-- Develop methodology for extrapolation of technology from one area to another.

-- Develop methodology to transfer improved technology to small farmers.

-- Train national technical personnel.

Dr. James Roman, who serves in San Jose for the PIADIC project, and who works under a USDA/PASA arrangement, accompanied the evaluation team members on the visit to Nicaragua and served as the liaison person for the various personal and institutional contacts made.

At the national headquarters level a meeting was held with the director and the chief of science and technology of the General Directorate of Agricultural Technology (formerly INTA) prior to going to the field. Field visits were made in the company of the CATIE annual crops resident, the animal production resident and an annual crops assistant.

a. Annual Crops Research

Four areas presently have been selected for annual crops research activities. These are Matagalpa, Esteli, and, in combination with the animal production research, the area of Jinotega. Site visits were made to the first two of these three areas.

Although some work has continued in Nicaragua by CATIE in cooperation with INTA since 1976, there was little continuity of that work with work presently underway, either in terms of personnel or present activities being built or previous progress. This most likely is due to the civil war that took place during that period in Nicaragua and the constitution of a new government in mid-1979. Through effective communication by IICA and CATIE representatives, the new government accepted collaboration beginning in early 1980. By June, 1980, the Minister of MIDA reaffirmed the original working agreement of the government of Nicaragua with CATIE.

CATIE personnel have been quite effective in establishing rapport with cooperating institution personnel and with farmers in the activity areas. Appropriate on-farm tests have been carried out in intercropping based on corn and beans, the primary small farmer crops grown in the test area. Production of vegetables both as intercrop with the primary production of corn and beans, as well as relayed production during the fallow period, are being tested. The methodological

steps of the PIADIC procedures are being carried out. Cooperating farmers visited in the area are enthusiastic about the research results. A visit also was made to the Sebaco field experiment station between Matagalpa and Esteli. At this station, variety trials are being conducted on a considerable range of possible a new crops that might be grown in association with corn and beans under small farmer conditions.

Under field experiment station in Jinotega called Bonitillo also is carrying out variety trials for possible new crops, including henniquen and flax. That experiment station was not visited.

In Esteli a visit was made to a cooperating production cooperative of thirteen farm families. Work here was concentrated on improved varieties of corn and beans and improved alternatives for intercropping corn and beans. In addition, tests were being conducted in planting intermittent double rows of grain sorghum with second crop plantings of beans as a means to reduce wind damage problems in beans and at the same time provide nitrogen form the beans for the grain sorghum. It was encouraging to note that in these activities the agricultural extension service was collaborating with INTA. More of this type of collaboration was planned for the following year.

b. Animal Production Research

Although we were able to spend a considerable amount of time with the CATIE animal production resident, we were unable to visit the Jinotega area where animal production research is to be carried out.

Animal production research is only now getting under way. The expectation is to work with a dairy module as well as with some other small animals, especially pigs.

2. PIADIC ACTIVITIES

Area profiles work, the area sample frame, and the agricultural information center activity all are active in Nicaragua. The technical information center activity and the area sample frame activity both got under way and were considerably developed prior to the revolution. They have continued since the revolution.

Nicaragua has an area frame of 360 segments which they have been using to collect data for two years. These segments cover only the cultivated area of the country and, according to INEC (Instituto nacional de Estadistica y censos) the implementing agency are valid only for aggregation of information at the national level for national accounts purposes. However, the PIADIC area sample frame specialist advise us that the Nicaragua frame had been designed to provide valid data to the regional level. He feels that there maybe some enumeration or statistical

analysis problems that do not permit the data to be used at the regional level at this time, but that these can be resolved.

In any event, INEC indicated that, for statistically valid information at the departmental level, a total of 1200 segments would be needed, excluding the undeveloped area of the Atlantic. INEC is anxious to increase its coverage to the entire country and also to expand segments to permit departmental aggregation of statistically reliable data.

INEC has held recent courses provided by PIADIC personnel in the utilization of area frame and in yield estimation. INEC has twenty full time enumerators that would be utilized for collecting information related to agriculture on a continuing and permanent basis if they could expand the segments sufficiently to permit valid departmental data collection. There is some indication that data from such a frame might be considered in substitution for future agricultural census activities.

INEC is seeking funding from the government or external sources sufficient to build the additional segments needed. INEC feels it has the installed capacity to build there segments on its own.

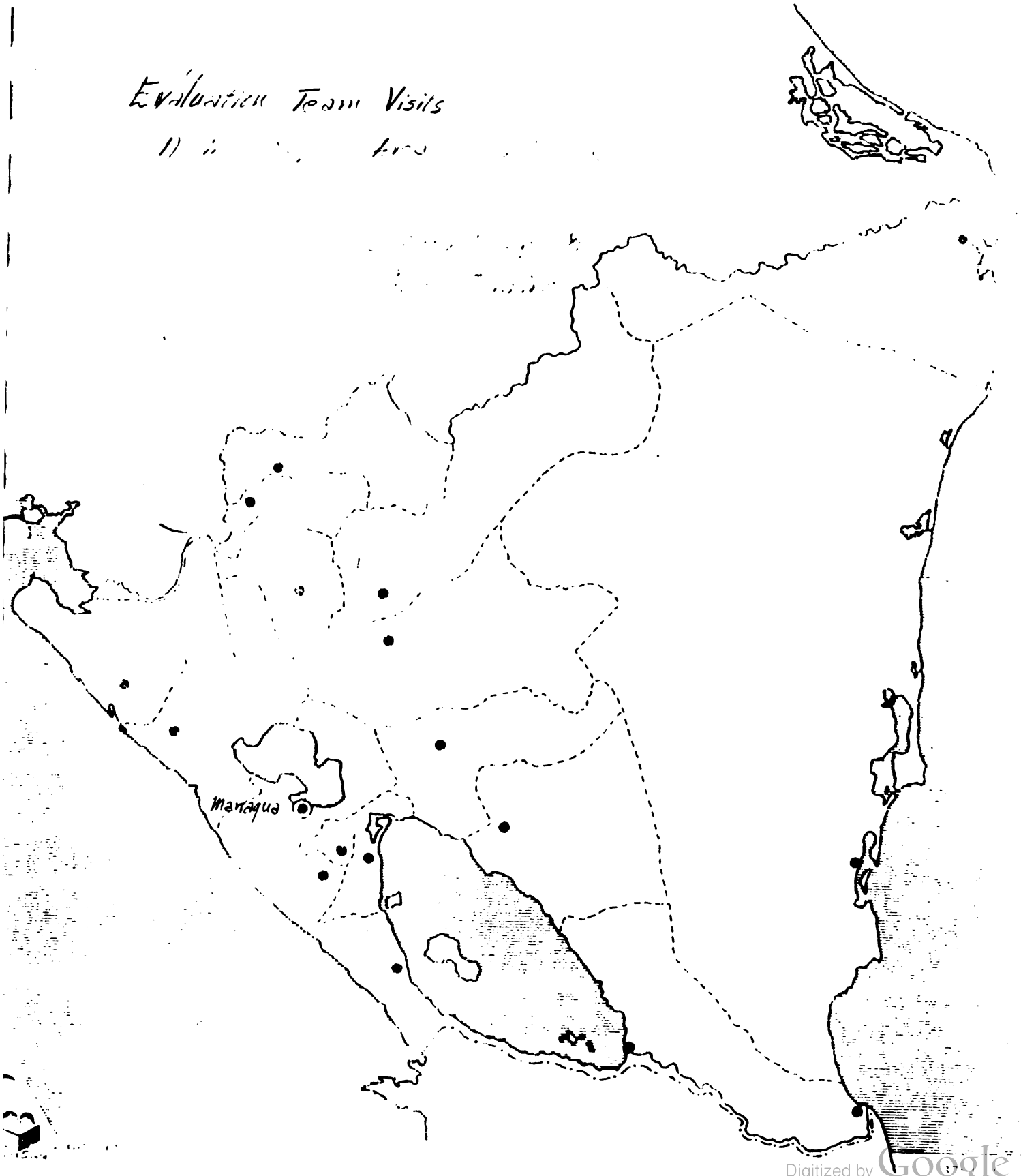
Information center activities are being carried out by the Nicaraguan Center for Technological Information (CENIT). The work they are doing is primarily that of collecting and indexing technical reports, publications and books. They offer data search services for a fee to clients.

who wish to obtain specific information on specific matters. Their focus tends to be on industrial and processing types of activities with very little base in agricultural production research.

Area profile work is being carried out with PROCAMPO which is the agricultural extension service for Nicaragua. An agreement was signed in May of 1980 to carry out four profiles; one in the north Atlantic, another in the south Atlantic, another in Matagalpa and a fourth in Nueva Segovia. A total of 6,000 square kilometers are being profiled. A large number of technicians were trained in seminars and short courses. A sample of more than 1,200 farms were selected in the four areas and data was collected. Procampo is expected to be able to computerize their information in December, 1980. Processing of this data was to be carried out with IICA computer facilities in San Jose.

PROCAMPO is very committed to the area profile studies. Something more than one hundred people are presently involved in these studies. The PROCAMPO director of projects expects to expand to other profiles in the near future.

NICARAGUA



APPENDIX A. - A PILOT STUDY PROPOSAL FOR INITIATING A WHOLE - FARM AND FAMILY APPROACH FOR FARMING SYSTEMS RESEARCH *

As explained in an earlier section of this report, the project paper for ROCAP project No. 596-0083 directed CATIE to "expand the research efforts to incorporate a wider farming systems approach", involving a complex interdependent association of plants, animals, soils, labor, tools, and other inputs. It further stated that the ecological and socio-economic environment should be considered, along with the farmer's knowledge, ambitions and abilities. Technological alternatives were to be designed within the conceptual framework of a small farm, tested on-site and under the farmer's management, and evaluated in terms of appropriateness to the farmer's existing system, ease of understanding and adoption, and increased income and employment generation.[1/]

The statements from the project paper are presented for a specific purpose: to emphasize the contract between current concepts and programs for farming systems research and the broader, more comprehensive approach conceived by those who prepared the paper.

Current CATIE/ROCAP projects in annual crops and animal production are designed and conducted as components (tech-packs

---

*Prepared by Dr. Albert Hagan.

1/ ROCAP Project Paper - Small Farm Production Systems, Pages 27-29.

and modules) which may be integrated into overall farming systems. These efforts are essential to provide valid "building blocks" for organizing farming systems but, within themselves, do not constitute farming systems research. Nevertheless, they do have many worthwhile and desirable characteristics. The conduct of research trials and tests with small farmers on their own farms helps keep technological recommendations practical and workable. The crop combinations in various forms of multiple - cropping and the livestock modules can simplify the task of planning and developing complete farming systems. And researchers can gain a better understanding of the small farmer's needs, special abilities and problems by working with him on a personal basis.

Much confusion and misunderstanding seems to prevail among professional researchers who are attempting to apply the so-called "new" Farming Systems Research approach in the conduct of small-farm development programs around the world.

A two-day symposium in Washington, D.C. in early December did little to clarify the existing situation. Most all project reports of current "farming systems research" involved only various forms of multi-cropping. In few cases were livestock enterprises even considered, even though most

small farmers depend, to some degree, on various kinds of livestock. Practically no attention seems to be given to some of the small farmer's major resources - such as family labor, animal power, equipment, outside investments, etc. ..... Outside sources of income and employment, which play major roles in the lives of many small farm families, often are overlooked. And, cultural and socio-economic factors - such as prevailing customs, inter-family relationships, educational levels, marketing methods, and family security measures - which often are major factors influencing the small farmer's willingness and ability to adopt and apply recommended new technologies in an effective and profitable manner, often are not considered adequately.

Some researchers in development programs have contended that the whole-farm and family approach to farming systems research is far too complex for doing research with small farmers and that many years probably will elapse before suitable theoretical models can be conceptualized and perfected for field use. The contention of the present proposal is that such restrictive ideas are erroneous and are in the minds of researchers; not those of the small farmers - - for reasons such as the following:

1) Every small and large farmer already has a farming system, and is accustomed to thinking of his farming and family activities as an operating unit;

2) Most small farmers would like to have a more productive and profitable farming system - - if it is in accord with their specific needs and goals for family security, employment, liquidity, etc., and is compatible with the cultural standards and norms in his community;

3) Many small farmers are receptive to new technologies if the impact on factors such as the above can be evaluated before major changes are made, not after;

4) Every small farmer (and large ones as well) has a plan for his farming system - often not a good, well-organized one but a plan by which he operates from day-to-day and year-to-year;

5) Farming system plans for most farms can be improved - - often in a spectacular fashion - - by incorporating appropriate new technologies in a well-organized way;

6) Most farmers can't wait for perfection in every new technology to be applied - - they are willing to experiment with changes if an evaluation to show the economic impact of the new plan is made before adjustments are undertaken; and, finally;

7) The farming systems approach is not a new phenomenon. Models (procedures and methodologies) for planning and evaluating overall farming systems have been in use for many decades. In Missouri, the writer has been involved personally in the development and application of such procedures for a period of 40 years.

The productive and economic consequences of such improved plans on thousands of Missouri farms have been observed and evaluated over a period of many years, using various kinds of research procedures.

Convictions about the wide-spread applicability of such planning procedures have been strengthened by personally observing and studying systems of farming used by farmers (small and large) in countries around the world - - including both

less developed and more modernized countries. In the first category, these include such countries as Nepal, India, Barbados, Puerto Rico, Libya, Tunisia, Tanzania, Guatemala, Nicaragua, Costa Rica, and the Philippines. Countries in the second include England, Denmark, Germany, Switzerland, Italy, Israel, Australia and many states in the United States, including Hawaii.

Attention now will be given to the purpose, objectives, and conceptual framework of this proposal.

PURPOSE OF PILOT STUDY

This pilot-study proposal is neither a distraction from nor an "add on" to the on-going project No. 596-0083, from the stand point of multiplying the "project outputs" expected. Instead, it is a procedure by which annual crops and livestock production scientists as a group can gain first-hand experience in planning and evaluating alternative farming systems for an individual small farm as the farmer himself must do it - - by conceptualizing and evaluating various farming systems, including both crop and livestock enterprises which are appropriate for total family resources. The working procedure would involve combining the farmer's experience and wisdom with the best-known scientific knowledge of professional staff members in conceptualizing workable farming systems and evaluating them from the standpoint of productivity, feasibility and economic consequences.

Hopefully, the pilot-study workshop would motivate the cooperating small farmer to develop the most promising system

over a period of years, with actual records of performance year-by-year for comparison with the selected long-range plan. While economists on the staffs could assume responsibility for collecting and analyzing performance records each year from the pilot-study unit, crop and animal scientists would have an excellent "setting" for testing various enterprise components included in the new system and an opportunity to study interactions among the various enterprises.

Specific Objectives

More specific objectives for the pilot-study workshop proposal are given below:

1) to acquaint staff members with a conceptual framework (working model) for planning and evaluating overall farming systems;

2) to develop appropriate components (crop and livestock budgets), for enterprises to be included in the analyses;

3) to make an economic evaluation of the overall farming system currently in use by the cooperating farmer;

4) to conceptualize and evaluate appropriate and feasible alternative systems for the same farm;

5) to cooperate with the farmer in implementing the farming system selected for development;

6) to establish the new farming system as an on-going case-study unit to provide performance records over time; and

7) to provide a convenient location and setting for observing the performance of individual crop tech-packs and livestock modules when combined in an overall farming system, for showing the results to other small farmers with similar resources, and for training new staff members in planning and evaluation procedures.

Conceptual Framework

Some logical and systematic procedure is essential for planning complete farming systems in an uncomplicated and sound manner. A ten-step working model has evolved in connection with the Missouri Balanced Farming System Program over a period of many years. It has been used with, and by, thousands of Missouri farmers in planning and developing improved farming systems for several decades. The procedure has been used in numerous training schools and shortcourses throughout the state during this time period - - for extension workers, vo-ag teachers, Soil Conservation Service technicians, credit institution personnel, other agency representatives, and farmers. It has formed the basis for undergraduate and graduate credit courses in the Agricultural Economics Department for many years, both on and off-campus.

Without elaboration at this point, the working model for planning and developing an individual farm plan consists of ten sequential steps as follows:

1. Inventory all resources;
2. Establish realistic longrun family goals;
3. Identify major problems;
4. Analyze the "present" farming system and compare the longrun consequences with other alternative systems which the farmer considers feasible and workable;
5. Choose a plan for development;

6. Implement the selected plan, in logical sequence over a period of years;

7. Assume managerial responsibility for development;

8. Exert Control - especially over investments and cash flow;

9. Evaluate progress, through analysis of year-by-year records; and

10. Adjust the system to keep abreast with changing conditions.

A reference handbook has been developed as a guide for planning systems in accord with the above procedure. It includes longrun price estimates and investment data as well as gross margin (income-over-variable-cost) budgets for numerous crop and livestock enterprises.

Work sheets (budgeting forms) also are available for each step of the planning procedure.

Planning methodologies have included block budgeting (a hand procedure most widely used), computer budgeting, linear programming and other procedures.

Various research procedures have been used for evaluating the production performance and economic consequences of the inproved farming systems over time - including individual case studies, case groupings, surveys, research panels, etc. Each procedure involves analysis of actual records of performance. For example, several hundred farmers in Missouri cooperate in a mail-in computerized farm record program and

transmit their records for the UMC Agricultural Economics Department each month for processing. End-of-year analyses provide an evaluation of the year's farm business operations. Groupings of farm recrods by major enterprises (types of farming) for special analyses are very useful for continual updating of enterprise budgets. For several case-study farms, continuous records of performance are avilable for more than twenty years.

The purpose of this review is to illustrate methodology and main features of a farming systems program which has evolved over a period of years. Obviously, such a broad-scale program could not be implemented quickly in any country. However, a cimilar one can be initiated with farming systems workshops and pilot studies, just as it was done in Missouri many years ago.

PILOT STUDY AND WORKSHOP PROPOSAL

In connection with the CATIE/ROCAP farming systems project, a pilot-study workshop for CATIE staff members could be arranged as an initial effort to help enhance staff understanding and coordination of recommendations from the complete farming systems point of view. The purpose and some objectives of this type of workshop were presented earlier in this proposal.

Such a workshop-type shortcourse

members of the Farm Systems Development Corporation in the Philippines in January/February, 1981. Highlights of this two-week shortcourse, which could be adapted to conditions in Central America, are as follows:

1) Orientation - Explanation of shortcourse procedures and responsibilities;

2) A brief review of economic and management principles and concepts applicable to the complete farming system approach;

3) Explanation and illustration of meghodologies for planning and evaluating farming systems;

4) A review of best-known production technologies, crops and livestock, applicable to the whole-farm planning (to be presented by local staff);

5) Visit to the "workshop farm" to observe and study the existing farming system and get the farmers' views on feasible adjustments;

6) Team work (the workshop group would be separated into work teams) in evaluating the "present" system on the workshop farm;

7) Evaluation of alternative plans for the workshop farm by work teams;

8) A comparison of the potential for the alternative plans developed;

9) A discussion of implementation procedures for a selected farming system; and

10) A review and evaluation of shortcourse procedures and content.

While the Philippine shortcourse was designed for a two-week period, it might be condensed to one week (6 days) with adequate on-site preparation in advance, perhaps for one to two weeks.

The actual format for such a shortcourse would need to be designed more specifically with the CATIE staff to meet the particular needs and conditions in the area. One feature, however, which seems essential is the use of a local workshop farm family unit, typical of the area, for the planning and calculations. CATIE economists, Louis Navarro and Marcelino Avila, have had basic training in this farming systems approach for planning and evaluating alternative systems for an individual farm. However, they might want outside TDY assistance for conducting an initial shortcourse. If so, selection of personnel with extensive experience in using this approach seems desirable.

If the above procedure were selected, some time before, and after, the actual conduct of the course would be needed for finalizing plans in advance, and for evaluating and adjusting the format for any future use. In the Philippines, two weeks are allocated for these activities.

APPENDIX B. - CONTRACT STATEMENTS AND INTERROGATORIES (ARTICLE I, AID/LAC-C-1414)

I - Small Farm Production System Project

A. The organization and operation of the CATIE Research Team, their operational roles in an interdisciplinary context to carry out the agreed research program both at CATIE and in their countries. Assessment of the quality and thoroughness of planning, selection, and assignment of personnel and assigned research tasks at CATIE headquarters and in the collaborating countries will be essential.

B. The timeliness and adequacy of the tech-pack validation process, using recommendations developed in the previous Small Farm Cropping Systems Project under Small Farm conditions. These validated tech-packs are to be designed for use as test vehicles for the systems transfer research element of the Small Farm Production Systems Project as recommended to National Extension Services.

C. The utilization of interdisciplinary teams to carry out the various outputs of the project. How are they organized and are they operating effectively? How do they relate to the national programs and to regional institutions in a manner conducive to attaining project goals? Do they effectively incorporate the national institutions and national technicians?

D. Evaluate the methodologies and procedures used by the integrated research team as applied to site selection, experiment design, selection basis for research treatments used in experiments, experiment execution, data collection and processing and data analysis. How does the overall research strategy relate to the operational research program? Is the research developing sound methods capable of creating additional profitable employment and meeting market demands?

E. How does CATIE and its staff relate to national technical agencies? Are their working relationships conducive to development of long term positive research and information transfer collaboration? Do CATIE and IICA stimulate cooperation and bring country researchers and agencies into the program or operate largely independently? How are

CATIE and IICA programs and staff viewed by national agencies and agricultural leaders? How can their relationships be made more effective?

F. Are reports prepared in a fashion as to make clear what CATIE is doing in project activities? How can they be further improved?

G. Financial limitation, caused at least in part by inflation, can reportedly limit potential end of project output goals. How serious is this? What can CATIE do to increase its efficiency on project operations vis-a-vis the budget? What can and should AID do to relieve this situation? What else will contribute most to maximum goal attainment at minimum cost to CATIE and AID?

H. Analyze the relationship between the two projects and other AID funded Small Farmer Research Programs in the five Central American countries and Panama. How does each also relate to bilaterial USAID agricultural programs? How can these relationships be further fortified? To what extent is the work that CATIE and IICA are dong under existing projects being accepted and incorporated into national efforts?

II. Agricultural Research and Information Project

A. The last twenty-seven months of this program have been designed to focus on the linkage between agricultural and rural sector data and research conducted nationally and regionally. How well has IICA/PIADIC made this shift? What further actions are needed to attain maximum project outputs?

B. Evaluate the planning and programming PIADIC has made to attain the goal. Is it adequate? What changes and improvements are needed? How is it being implemented in the countries? Can this be improved? Are project elements on schedule? Will goals be attained?

C. How well is the program being absorbed into IICA itself? Are objectives understood and appreciated? Can more be done to make this activity more useful to and supportive of other Central American agricultural initiatives of IICA and to the countries? How is IICA staffing to meet its commitments and build toward self-sufficiency in this area?

D. How is the project received by countries and bilaterial USAIDs? How can the project be made more useful to national and regional needs? What are national and USAID views on its utility and areas for future operations as IICA or AID continues support to the information generation and use area?

E. Are the quarterly and annual reports adequately reflecting actions being taken in the project? How can they be made more relevant?

Reports

The Contractor's team leader shall discuss and prepare a draft report, which will consist of consolidation of the sections of the report prepared by the other team members. The consolidated draft report shall be submitted.