

PD-AAX-283

CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) - PART I

1. PROJECT TITLE Agricultural Technology Development and Agricultural Technology Transfer PD AAX-283 <i>54582</i>			2. PROJECT NUMBER 525-0180 525-0227	3. MISSION/AID/W OFFICE USAID/Panama
B. KEY PROJECT IMPLEMENTATION DATES			4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) 87/1	
A. First PRO-AG or Equivalent FY _____	B. Final Obligation Expected FY _____	C. Final Input Delivery FY _____	<input type="checkbox"/> REGULAR EVALUATION <input checked="" type="checkbox"/> SPECIAL EVALUATION	
6. ESTIMATED PROJECT FUNDING			7. PERIOD COVERED BY EVALUATION	
A. Total \$ _____			From (month/yr.) _____	
B. U.S. \$ _____			To (month/yr.) _____	
			Date of Evaluation Review October 10, 1986	

B. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
<u>Recommendations for both projects</u>		
1. Establish adequate levels of counterpart funding for project.	F.Vigil D.Drga T.Noriega R.Ortiz	Jan. 31, 1987
2. Establish a mechanism to insure timely counterpart funding for 1986 and 1987.	F.Vigil D.Drga T.Noriega R.Ortiz	Jan. 31, 1987 Feb. 28, 1987
3. Establish a mechanism to formally link agricultural research (IDIAP) and extension (MIDA) activities.	F.Vigil D.Drga T.Noriega R.Ortiz	Feb. 28, 1987

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CFI Network	<input type="checkbox"/> Other (Specify) _____
<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	_____
<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify) _____
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P	_____

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

A. Continue Project Without Change

B. Change Project Design and/or Change Implementation Plan

C. Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

David Schaer, Chief, AGR, USAID/Panamá *DHS*
 Frank Pope, Evaluation Coordinator, USAID/Panamá *FP*
 Stella Patiño, Financial Analyst, USAID/Panamá *SP*

12. Mission/AID/W Office Director Approval

Signature *Raymond F. Rifenburg*
 Typed Name Raymond F. Rifenburg, A/Director
 Date Feb 18/87

CLASSIFICATION
PROJECT EVALUATION SUMMARY (PES) - PART I

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<input type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION		

5. KEY PROJECT IMPLEMENTATION DATES A. First PRO-AG or Equivalent FY <u>79</u> B. Final Obligation Expected FY <u>87</u> C. Final Input Delivery FY <u>88</u>	6. ESTIMATED PROJECT FUNDING A. Total \$ <u>21,700,000</u> B. U.S. \$ <u>11,200,000</u>	7. PERIOD COVERED BY EVALUATION From (month/yr.) <u>Aug. 1983</u> To (month/yr.) <u>Sept. 1986</u> Date of Evaluation Review <u>Oct. 10, 1986</u>
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8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., program, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
1. Prepare a position paper which considers the desirability of a project extension.	D.Drga	Feb. 28, 1987
2. Reinforce the researcher/farmer linkage	D.Drga T.Noriega	On-going

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS <input checked="" type="checkbox"/> Project Paper <input checked="" type="checkbox"/> Implementation Plan e.g., CPI Network <input type="checkbox"/> Other (Specify) _____ <input checked="" type="checkbox"/> Financial Plan <input checked="" type="checkbox"/> PIO/T <input checked="" type="checkbox"/> Logical Framework <input type="checkbox"/> PIO/C <input type="checkbox"/> Other (Specify) _____ <input checked="" type="checkbox"/> Project Agreement <input type="checkbox"/> PIO/P	10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT A. <input type="checkbox"/> Continue Project Without Change B. <input type="checkbox"/> Change Project Design and/or <input checked="" type="checkbox"/> Change Implementation Plan C. <input type="checkbox"/> Discontinue Project
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11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Name and Title) Donald Drga, Project Officer, USAID/Panama <i>DD</i> Paul Tuebner, Project Loan Officer, USAID/Panama <i>PT</i>	12. Mission/AID/W Office Director Approval Signature _____ Typed Name _____ Date _____
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CLASSIFICATION
PROJECT EVALUATION SUMMARY (PES) - PART I

1. PROJECT TITLE Agricultural Technology Transfer	2. PROJECT NUMBER 525-0227	3. MISSION/AID/W OFFICE USAID/Panama
	4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) 87/1	
<input type="checkbox"/> REGULAR EVALUATION <input checked="" type="checkbox"/> SPECIAL EVALUATION		

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING		7. PERIOD COVERED BY EVALUATION	
A. First PRO-AG or Equivalent FY <u>82</u>	B. Final Obligation Expected FY <u>85</u>	C. Final Input Delivery FY <u>89</u>	A. Total	\$ <u>13,840,000</u>	From (month/yr.)	<u>Oct. 1982</u>
			B. U.S.	\$ <u>7,500,000</u>	To (month/yr.)	<u>Sept. 1986</u>
					Date of Evaluation Review	<u>Oct. 10, 1986</u>

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
Evaluate project personnel requirements, develop (a) revised staffing pattern, and (b) hire required personnel.	R.Ortiz	March 31, 198 April 30, 198
Establish project autonomy through official delegation of authority to the field.	R.Ortiz	Feb. 28, 1987
Establish a mechanism for involving the private sector in project planning at the field level.	R.Ortiz F.Vigil	Jan. 31, 1987

9. INVENTORY OF DOCUMENTS TO BE REVIEWED PER ABOVE DECISIONS			10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT	
<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify) _____	A.	<input type="checkbox"/> Continue Project Without Change
<input checked="" type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	_____	B.	<input checked="" type="checkbox"/> Change Project Design and/or
<input checked="" type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify) _____		<input type="checkbox"/> Change Implementation Plan
<input checked="" type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P	_____	C.	<input type="checkbox"/> Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)		12. Mission/AID/W Office Director Approval	
Rudolph Vigil, Project Officer, USAID/Panama		Signature _____	
Iso Carbonelli, Project Loan Officer, USAID/Panama		Typed Name _____	
		Date _____	

USAID/Panama PES 87/1 Part II
ATD/ATT Evaluation

Part II of the this PES was prepared in accordance with IAC/DR guidance for evaluations dated October 1983. Part II is a summary statement which contains Mission comments on four general areas:

- The overall quality of the contractor's report, including whether the scope of work was followed, whether the evaluation was useful, and how the Mission plans to use the report.
- The recommendations made by the evaluation team, particularly those not accepted by the Mission with an explanation as to why they were not accepted.
- The adequacy of the executive summary, and any revisions or additions that would improve it.
- Lessons Learned.

Quality and Utility of the Evaluation Report. The Mission contracted a five person team to carry out this sectoral study of two projects supporting the development and transfer of agricultural technology in Panamá. The scope of work for the task is very broad but concentrated on management issues. During meetings with the Mission at the start of the consultancy USAID/Panamá indicated strong interest in having the evaluation done within the framework of an assessment of the whole sector, and that it should provide guidance for long-term project programming. The consultants were encouraged to read Mission strategy documents and to meet with high level GOP and private sector individuals not closely related to the two projects under evaluation. This broadened the scope of the evaluation, added substantial work and complicated the organization of the document.

The final report was a combination of several individual pieces written independently and woven together into a very long and rambling document. Because of the multiple authors there were numerous repetitions and some painfully obvious inconsistencies, especially in the area of future strategic directions for the Mission to consider.

The Mission took two actions: (1) the project evaluation team drew out the numerous recommendations from the report and classified them into action recommendations and lower grade suggestions for routine management attention and; (2) the evaluation document was edited to remove inconsistencies, repetitions and inaccuracies in preparation for translation and distribution to the GOP counterpart institutions.

Although still a long document, the Mission feels that it will be particularly useful for project management as a guide for discussions with their counterparts, as a starting point for project implementation planning, and as a strong source document for development of a follow-on project. The report provides a good summary of the evaluation of these projects and their impact on the development of this important public service to the agricultural sector.

Recommendations: Comment on their Acceptability and Applicability. The Executive Summary successfully presents the principal evaluation findings and recommendations. The main body of the report however overused the word "recommend" to a point where the reader became confused as to priorities and to what lies within the purview of the two projects. Editing was required to sharpen the difference between a "Recommendation" and advice to the project management teams, and to eliminate contradictory recommendations. One specific example of conflictive recommendations is worth mentioning.

The consulting team learned that during the first quarter of the last two calendar years the government had not disbursed operating funds to the projects for sums beyond those required to pay salaries. This is true throughout the Panamanian public sector because of liquidity problems at the start of the fiscal year. This seriously crippled both projects, virtually nullifying the validity of field tests programmed for the first crop cycle (April through October) because of the lack of sufficient inputs. Accordingly the team recommended conditioning project continuation by USAID to the establishment and timely disbursement of appropriate amounts of project counterpart funds.

The consultants then suggested that USAID/Panamá allow the GOP to use project funds to cover counterpart contributions this year as a short term measure to alleviate this cash shortage, with an agreement to pay it back later on in the year when funds became available. This recommendation was rejected by the review team as inappropriate and counterproductive. The "recommendation" was deleted from the text, but is quoted below to illustrate how inconsistent it is with the recommendation to USAID to require the GOP to demonstrate commitment to the project by providing adequate financial support:

"As a short-term solution, the Evaluation team recommends that USAID/Panamá, the GOP, and the private sector establish a revolving fund to meet the counterpart requirements during the first part of the year when the GOP does not have adequate funds available. The GOP is obligated to reimburse the revolving fund by July 1 of any year in which the fund is used. This revolving fund should be established in a private sector bank or in the Banco Nacional de Panamá."

Adequacy of the Executive Summary. The original Executive Summary was adequate although it was, as mentioned before, weakened by too much detail. The attached Executive Summary has been edited to limit the discussion to issues of importance.

Lessons Learned

Design Time Horizon. As is mentioned several times in the evaluation, the development of Agricultural Research and Extension capacity from scratch is a long term matter. Both projects would have benefitted from a more realistic design approach to the estimation of time and resources required for the achievement of the projects' purposes.

Inter-institutional Collaboration. Although project documents program direct collaboration between IDIAP and MIDA extension, performance has been spotty and is certainly not at the level to be expected after three years of project implementation. The major obstacle to close collaboration seems to be the failure of top administrators in making this a clear and urgent policy in each participating agency. In the case of these two projects, inter-institutional collaboration is critical to attainment of the project's goals. The project logical framework should therefore reflect the importance of the linkage process and build in targets to measure progress and make management accountable for progress.

Evaluation Impact. The evaluation has taken six months from start to finish. It has involved persons from the farm level all of the way up to the Minister of Agricultural Development. As a result, there is a better understanding in both the GOP and USAID of the shared goals of these two projects than ever before. This new awareness has put into motion the intellectual process of collaboratively reasoning out the best ways to develop and transfer agricultural technology in Panama. This momentum can, however, decay from lack of continuing collaborative investigation and debate.

After the 1983 ATD evaluation, the Mission and IDIAP moved quickly to respond to recommendations that could be taken care of at the technical level, but the call made by the evaluation team for greater high level efforts to link the projects, and research and extension in general, fell by the wayside.

This evaluation has involved a much larger group, and has benefitted from a clearer institutional framework, and positive changes in attitudes and official policies regarding the provision of public agricultural services to individual farming enterprises. The evaluation has clarified the issues, and created a strong consensus at all levels that research and extension must be brought closer together.

As we learned from the last evaluation however, the consensus brought about by the evaluation process can quickly be lost without the commitment by project management to keep the linkage issues high on the policy dialogue agendas of USAID Panama and GOP senior management.

Attachment A - ATD/ATT Evaluation

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ATT Logical Framework.....	

List of Abbreviations

AID	Agency for International Development
BDA	Banco de Desarrollo Agropecuario Agricultural Development Bank (Panama)
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza Tropical Agricultural Research and Training Center (Costa Rica)
CIAT	Centro Internacional para la Agricultura Tropical International Center for Tropical Agriculture (Costa Rica)
CIMMYT	Centro Internacional para el Mejoramiento del Maíz y Trigo International Maize and Wheat Improvement Center (Mexico)
CIP	Centro Internacional de la Papa International Potato Center (Perú)
DNPS	Dirección Nacional de Planificación Sectorial National Directorate of Sectoral Planning (a division of the Ministry of Agricultural Development Panama)
FAUP	Facultad de Agronomía de la Universidad de Panamá Faculty of Agronomy University of Panama
GOP	Government of Panama
IARC	International Agricultural Research Center
IDIAP	Instituto de Investigación Agropecuaria de Panamá Panama Institute of Agricultural Research
MIDA	Ministerio de Desarrollo Agropecuario Ministry of Agricultural Development (Panama)
SENEAGRO	Sistema Nacional de Extensión Agropecuaria National Agricultural Extension System (division of the Ministry of Agricultural Development Panamá)
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

A. Evaluation Objectives and Methodology

The following is a formative evaluation of the Agricultural Technology Development and Agricultural Technology Transfer projects, and an assessment of public sector participation in the generation and transfer of agricultural technology in Panama. The evaluation is part of a larger effort by USAID/Panamá to define the current farming environment and to elaborate a long range agricultural development strategy.

Panamá's public agricultural technology development and transfer (ATD&T) system is comprised primarily of three organizations: (1) the University of Panamá Faculty of Agronomy (FAUP); (2) the Agricultural Research Institute (IDIAP); and (3) the Ministry of Agricultural Development (MIDA).

The Agricultural Technology Development (ATD) project is assisting IDIAP to establish an area-focused adaptive research program involving experiment station and on-farm validation trials. The project is nearing completion and USAID/Panama is exploring whether to continue its support to IDIAP.

The Agricultural Technology Transfer (ATT) project is assisting MIDA to develop agricultural extension services in the Province of Chiriqui and two sites in the Provinces of Herrera (Parita) and Los Santos (Tres Quebradas).

The evaluation team had three main tasks: (1) to assess the general progress to date of the ATD and ATT projects and their respective lead institutions (IDIAP and MIDA); (2) to assess ways to assure an adequate supply over the long term of viable agronomic technology and the transfer of the same to producers and; (3) to provide a strategic context for agricultural technology development and transfer within the Mission's and the GOP's long term agricultural strategy. In this latter respect, the evaluation is concerned with determining what Panamá's ATD&T system should optimally look like five to ten years from now and what USAID/Panama, the Government of Panama (GOP), and the private sector must begin to do to facilitate the evolution of the desired ATD&T system.

The Team analyzed each project in terms of the following eight subjects: (1) project purpose; (2) organizational structure, staff, and physical resources; (3) budgeting and financial management; (4) methodology for planning; (5) technical assistance; (6) training and career development; (7) technology development (or technology transfer) methodology; and (8) role of Panamá's public and private institutions in project implementation.

The evaluation concentrates primarily on these eight components which are largely internal to the ATD and ATT projects. However, the Team recognizes that there are conditions external to the ATD&T system that affect the impact these projects have on agricultural productivity and farmer income. These include: (1) agricultural policies that provide incentives for investment and the assumption of risk; (2) efficient markets; (3) competitively-priced production inputs, including credit and; (4) freedom from political interference.

To gain an in-depth understanding of Panama's ATD&T system the team dedicated a substantial amount of time to research. This included interviewing individuals who work for IDIAP, MIDA, the FAUP, and other public sector organizations. Team members also spoke with members of the technical assistance teams, with USAID officials in Panama and Washington, and with agricultural producers, input suppliers, and food processors in the private sector. Field trips were taken to project sites throughout the country. In addition, ample study was made of secondary reference documents. These documents included materials prepared by technical assistance teams, IDIAP, MIDA, and USAID; specific studies on the ATD&T system; and recent assessments of Panama's agricultural sector.

B. The Agricultural Technology Development Project

1. Introduction

The long-term objective of the Agricultural Technology Development project is to contribute to increasing income and employment opportunities for Panama's small- and medium-sized agricultural producers. This is to be accomplished by increasing the labor and land productivities of the targeted groups, and by strengthening IDIAP's institutional capabilities through technical assistance, staff expansion and training, and the provision of physical support facilities. The research is to be primarily field-oriented, as compared with research conducted on the experiment stations. The project emphasizes applied research, and the adaptation and dissemination of technologies applicable to the needs of the agricultural sector.

IDIAP's research achievements have been many. Throughout its 11 year history the Institute has developed new varieties and improved agronomic practices for rice, corn, beans and tomatoes. The most important commercial variety of tomato in the country was developed by IDIAP. In addition, IDIAP has developed improved production practices for onions and potatoes. In the case of onions, not only have yields and gross production increased substantially, but production has been extended into the rainy season for the first time.

IDIAP has also made impressive progress in dual purpose cattle raising, especially in pastures. It has initiated a pest management program that includes the documentation of principal weed and insect

problems, and a proposed plan of research. IDIAP has continued to improve its program in mixed farming systems in areas such as Caisán and Baru.

This growth in research followed a concomitant growth in the size of the institution. In 1975, IDIAP's technical staff numbered 23. By 1986 this number had increased to 133. The Institute's budget also had increased to approximately \$3.7 million. IDIAP has developed important linkages with international organizations that provide technology, training, and technical support.

Most importantly, IDIAP has decentralized its organization and has developed a problem-oriented, regionally focused, adaptive research system. But growth and decentralization has also made planning and management a much more complicated affair. How to adjust the project to respond to this much more sophisticated institutional environment is the leading theme of the evaluation. The following section highlights major findings and conclusions and makes some general recommendations for the improvement of the institution

2. Major Findings

a. Linkage with Extension and Credit

Although IDIAP has improved its geographical presence, and therefore its capacity to develop and validate technology packages particularly suited to the many micro-environments of Panama, it has not developed a vehicle to promote the adoption of that technology quickly and by large numbers of farmers. If IDIAP is to succeed in becoming an important factor in the economic growth of rural Panama it must develop strong direct linkages with MIDA for extension and BDA for credit. Together these three are supposed to be the public sector's united thrust to raise the productivity and profits of farmers, yet they seem only to work together when individuals take initiative at the lowest levels. IDIAP should take the lead in forging this link.

b. Program Management

IDIAP currently develops an Annual Operating Plan (POA) that is used for the preliminary budget and as a benchmark from which to evaluate the progress of the Institute's five year plan. The POA is a major undertaking and provides detailed information on projects and individual experiments for the upcoming year. The quality and amount of work contained in the POA clearly indicate that IDIAP takes this responsibility seriously. The POA does not provide an appropriate guide for managers or researchers however. First, it is prepared without the benefit of the current year's research results; thus, the 1987 POA is now being prepared using research results from 1985. Second, researchers at all levels of IDIAP are not adequately involved in the planning process. Third, there is little interaction among researchers in the various commodity programs and geographic areas. Thus, the POA is prepared without important feedback.

The Evaluation Team recommends that IDIAP devise a simplified POA that meets the budgeting requirement, but is not a detailed presentation of proposed experiments. Then, once the current year's research results become available, IDIAP's researchers and planners should evaluate these results and prepare a Work Plan, or PT (Plan de Trabajo), that provides a detailed presentation of the planned experiments for the upcoming year with a system of information, control and feedback. This Work Plan should take into account the comments for those working on other commodities and in other geographic areas and should provide for broad-based participation in its development. The Annual Work Plan can become the starting point for the development of medium and long-term planning documents.

c. Research Planning

IDIAP researchers are conducting research on approximately 27 different commodities. There is little evidence of a formal methodology for the selection and prioritization of these activities and as is stated in the previous paragraph results from earlier experiments are not used as part of the planning process.

IDIAP should define its research priorities as soon as possible. In recent years several excellent studies (by IDIAP and by outside consultants) provide analyses of commodities (or commodity areas) that can serve as the starting point. IDIAP should combine this information with the goals of the agricultural sector, knowledge of market conditions, and the Institute's determination of how its resources can be best allocated. In defining its priorities, IDIAP should remember its original mandate to work with the nation's smallest farmers, and to maintain research on basic food crops.

d. Research Methodology

The decentralization of IDIAP's operation has had positive effects on agricultural research by promoting increased regional, experiment station, and on-farm research. The evaluation team feels that the project focus on on-farm adaptive research is appropriate for Panama and should be continued and strengthened. The relationship between producers and IDIAP field staff provides a critical link between the individual consumer of technology and the public sector institutional system responsible for technology development. This bottom-up, demand driven model will hopefully create a situation where private sector demand for IDIAP services will provide the political impetus necessary for increased levels of support from the central government and the private sector and a gradual reduction in need for donor support.

e. Counterpart Funding

The recurrent cost issue must be resolved if the project is to have the desired impact. Since most field work is heavily influenced by seasonal factors the timeliness of funding is critical to meaningful testing. Late arrival of inputs or underfunding can seriously affect the results of an experiment thereby lessening its value. The evaluation team found that the IDIAP budget allocates less than 12 percent of its total to operational expenses, the 88 percent balance being allotted to salary and salary related costs. This very low percentage means that IDIAP has little room to manuvre in the event that transfers from the GOP are below budget (which is often the case). Since salaries take priority this means dividing the already meager pie into even smaller pieces. If one takes into account the large number of commodities under research and multiplies that by the different geographical areas that carry out trials within each commodity group it becomes clear why priorities must be set and resources concentrated accordingly.

In order to protect the research effort from these negative effects the evaluation team recommends that IDIAP management work to increase the proportion of its total budget allocated for operations and in the meantime concentrate what funds are available on fewer activities in order of priority. USAID Panama can help by including these issues in their policy dialogue agenda, particularly at the levels of the Ministry of Planning and the Controller General Office.

Finally, the evaluation team recommends that IDIAP be encouraged to promote cost-sharing arrangements with farmers groups such as those already working with the Banana and Plantain Growers Association and the Boquete Horticultural Cooperative. Under both of these special programs, the private sector hosts are responsible for many inputs required to support the IDIAP technicians carrying out field research on jointly agreed upon crops. This type of support not only frees up scarce resources but more importantly opens a formal line of communication between farmers and researchers. This innovative program is an important unexpected development and should be strongly supported by USAID.

e. Human Resources

As was mentioned before, IDIAP has been successful in decentralizing its operations. The technical staff in particular is well distributed into the field fulfilling the priority task of carrying out adaptive research on-farm and in the different geographic areas of Panamá. Nevertheless, an analysis of personnel charts and payrolls indicates that the central office in Panamá still has much more technical talent than it needs and that IDIAP should make an effort to mobilize more of these resources into the field. Since the central office is primarily for management and administration, costs charged to the central office can be reduced substantially. If these steps are not taken then IDIAP will run the risk of developing an administrative and management

team made up of economists and doctors in the agricultural sciences. Project training funds were allocated to these technical specialties in order to have those skills in the field, if administrative and management skills are in short supply then IDIAP should be encouraged to discuss training and technical assistance in those areas with USAID.

f. Technical Assistance

The long-term technical assistance provided by Rutgers University in the field has been effective. The dedication and creativity of the technical assistance team and the IDIAP staff has created a positive image and concrete successes (acceptance of technology) with producers. Two excellent examples of this are the onion and pastures programs. Indications are that the livestock program will be equally successful.

The IDIAP/Rutgers field teams have developed mutual respect and have earned the confidence of farmers through a sustained effort over multiple crop cycles. This nascent trust is the foundation for an institutional prestige that can only be earned by many more years of solid work. The long term technical assistance provided by the project plays a key role in maintaining the credibility and quality of IDIAP's work and should be continued as long as the project is active, and certainly if USAID intends to continue support to IDIAP.

IDIAP by any measure is a very young institution that can benefit greatly from continued technical assistance. The evaluation team recommends that greater emphasis be placed on technical assistance in the area of planning and management.

g. Training

The AID project has provided training for 23 researchers at the MS level and 7 at the Ph.D. level. This group of scientists are the technical foundation of IDIAP. In addition the project has funded over 425 man-months of short-term training. Both of these activities have had a tremendous impact on the IDIAP professional staff. The evaluation team recommends continued support for graduate level education in the U.S. and short-term training particularly in International Agriculture Research Centers in Latin America. Special emphasis on public administration is desirable.

The team was impressed by the faculty at the FAUP and the excellent progress that the institution is making in improving its programs. Although the AID project does not contemplate support to the FAUP, the evaluation team feels that it is such an important part of the fundamental training of Panamanian farmers and agricultural professionals that every effort should be made to encourage the closest possible collaboration and interaction between these two institutions. Project funded joint training activities may offer the opportunity to strengthen this natural link.

3. Action Recommendations

- Develop official linkages with MIDA Extension and BDA

- Improve IDIAP planning methods

Work with IDIAP in simplifying the POA and developing a work plan and a sample management information system for tracking progress and adjusting the program.

- Rationalize and prioritize the research program

- Assure Counterpart funding on a timely basis and at agreed upon levels

- Increase the level of operating funds in relation to salaries

- Reduce central office costs

C. The Agricultural Technology Transfer (ATT) Project

1. Introduction

The ATT project was designed as a pilot project to establish and test an agricultural extension system in Chiriqui Province and two other locations (Parita, Herrera and Tres Quebradas, Los Santos). The extension approach to technology transfer is not new in Panama since it was functioning under government auspices until eliminated in the early seventies.

As conceived in the project design, this extension system would provide small and medium farm operators with a continuous flow of adapted agricultural technologies effective in increasing agricultural productivity and farm income. In contrast to the official development philosophy of selective distribution of technology in response to centrally generated commodity production goals, the ATT project design sought to test a system motivated by farmer demand for locally adapted technology. These technologies would be provided by the Instituto de Investigacion Agropecuaria (IDIAP), the state agricultural research institute. Finally, if successful as a pilot effort, the project experience would be utilized to design a follow on project to develop a national agricultural extension system.

The ATT project is being developed within the Ministerio de Desarrollo Agropecuario (MIDA), with national level coordination being provided by the Servicio Nacional de Extension Agropecuaria (SENEAGRO), and regional level implementation being provided by the MIDA Regional Directorates (MIDA/RDs). Long-term technical assistance to the project is being provided by Chemonics International (two expatriate resident consultants).

2. Progress to Date

While the project was slow in getting underway, significant progress has been made during this past year. As the project is only now completing its first full year of field activities, systematic data are not yet available on its impact on farmer adoption of technology or increments in farm level productivity and income. Yet some early indicators of project impact are evident (e.g., farmer adoption of solar-heated dryers). Further, given the difficult institutional environment in which the project is being implemented, even the provision of project inputs (e.g., technical assistance, training, or establishment of demonstration plots) may be considered as achievements. Key project achievements to date include:

Establishment of the project coordination team, technical units, and a field-level program implemented through area extension offices (Agencies).

Formulation and implementation of a "market-led" strategy for achieving technology transfer.

Preparation of a training plan and implementation of long-term and in-service training.

Development of area profiles as well as work plans based on identified production problems.

A total of 69 on-farm demonstrations were established during the first cropping cycle of 1986; about 110 demonstrations and/or field tests will be established by the end of 1986.

Audio-visual materials are being developed, including radio programs.

Disbursement of project funds from MIDA/SENEAGRO was decentralized to the MIDA Regional Directorates.

A special projects fund (US\$50,000) was established to finance farmer and extension worker proposals to test promising technologies.

3. Problems and Constraints

Since its inception the ATT project has been fraught with political and administrative problems that have impeded the flow of resources and the actions essential for project implementation. MIDA's attitude toward the project often appears to be at odds with the project design. For example, the Evaluation Team heard reports that project funds have been used for non-project activities, that project staff were ordered not to form or work with local agricultural committees, and that MIDA officials have been reluctant to work with private sector groups. MIDA organizationally is still oriented to implementing a top-down model of agricultural development. Under this model the National Directorates conceive of the ATT project as an extraordinary resource to be used to supplement their own resources. The project, in contrast, seeks to develop local initiative, through collaboration of farmers, MIDA extension, IDIAP, and private sector participants in the farming economy, with a final objective of improving productivity and profits.

Beyond the problem of MIDA's attitude toward the project, resources have not flowed evenly to the project. The counterpart funds provided by the GOP to meet project operating costs have been less than the GOP's obligation. Further, counterpart funds are not received in a timely manner. Even when funds are allocated, there have been various problems in getting these funds down to the project level. The problem is aggravated by the fact that the system for making purchases and expenditures is very cumbersome and turnaround time is extremely slow.

The project also faces problems in terms of the number and kinds of personnel assigned to the project. While MIDA has begun to place a greater emphasis on technology transfer, it does not appear to recognize the urgent need to separate this technical function from the regulatory and political functions. Commingling of technology transfer with MIDA's highly politicized activities, under a personnel system that provides no incentives for excellence in performance, makes establishing credibility with farmers and the private sector very difficult.

Further, the Evaluation Team is concerned that the ATT project has not been more effectively linked with USAID/Panama's Agricultural Technology Development (ATD) project that is being implemented in IDIAP. This problem, however, is symptomatic of two even more basic problems: (1) that MIDA's extension service is not effectively collaborating with IDIAP's on-farm adaptive research program; and (2) that USAID/Panama is not effectively coordinating these two projects (ATT and ATD).

Beyond the need to establish closer collaboration between the ATT project and IDIAP's on-farm adaptive research program, the project's methodology for carrying out technology transfer to farmers is generally sound. However, in reviewing the ATT project, the Team found that the project budget must be reprogrammed. The key project inputs that are currently underbudgeted are technical assistance, training, and extension activities.

4. Recommendations

Despite these problems and constraints, the Evaluation Team believes that the ATT project is contributing to the development of Panama's ATD&T system. In particular, the ATT project is assisting MIDA to develop its field extension service capability. Of note, in-service training has been intensive, a "market led" program of field demonstrations is being implemented, and farmers are increasingly being involved in project planning and implementation. Further, there are early signs that the project is having an impact on farmer adoption of improved technology and that the project is starting to develop credibility with the private sector.

Although the project yet faces many problems, the problems are not insurmountable. Further, considerable resources have been invested to bring the project to this juncture where it is now starting to make an impact in the field. The problems facing the project do need to be solved in order to facilitate in project implementation and lay the institutional base necessary for the project to evolve into a national agricultural technology transfer system.

Accordingly, the Evaluation Team recommends that USAID/Panama should continue its support the project through the PACD of September 30, 1989, with the long-term technical assistance component also being continued. The Team firmly believes, however, that continued USAID/Panama support to the ATT project must be made contingent upon the commitment of the GOP to assume responsibility for meeting the project's counterpart funding obligation in a full and timely manner.

To this end, the Evaluation Team recommends that USAID/Panama should establish that the ATT project will not be continued unless:

- a. The GOP has demonstrated by the end of the first quarter of 1987 that it has been able to meet the project's counterpart funding requirement; and
- b. The GOP has established a timetable for and taken significant steps toward implementing institutional reforms that effectively resolve the problem areas (see items a to d below) that have plagued the ATT project.

In the event that the GOP does not met these conditions, the Evaluation Team recommends that USAID/Panama terminate the ATT project effective September 30, 1988, or continue the project under an alternate mechanism such as an appropriately amended ATD project.

Beyond the specific issue of the GOP's commitment to meeting the counterpart funding obligation for the ATT project, the team has identified four initiatives that MIDA can take to improve the efficiency and impact of the project. The initiatives are:

a. Improved Linkage of ATT Project with IDIAP's Technology Development Function

The Evaluation Team recommends that the ATT project place greater emphasis on linking the project's extension personnel with IDIAP's researchers. Improved collaboration between technology transfer (MIDA's ATT project) and technology development (IDIAP's ATD project) will increase the ATT project's capability to develop technology transfer programs for those commodities and technologies holding the greatest potential for increasing the farmer's productivity and income-earning capability. To this end, the Team recommends:

- (1) That the ATT project's extension personnel participate in the design, implementation, and evaluation of IDIAP's on-farm adaptive research programs;
- (2) That IDIAP's researchers work closely with ATT project personnel in determining the technologies to be transferred to farmers and other clientele groups; and
- (3) That the project's personnel play an active role in providing feedback to IDIAP on field-level problems needing greater research attention.

The Team believes that the establishment of a working relationship between IDIAP and the ATT project has been impeded by a lack of consensus on the role which IDIAP should play in the ATT project and how this role should be financed. The Team recommends that the appropriate parties within USAID/Panama, MIDA, and IDIAP resolve this issue at the earliest possible date.

b. Clarification of Authority for the ATT project

The Evaluation Team recommends that MIDA delegate greater authority to the ATT project in order to speed implementation and lessen political interference.

The key problems seem to be rooted in overly complicated procedures in the financial system and unclear areas of authority. The accounting in the field and at MIDA headquarters in Santiago is adequate, the problem is moving transactions through the system. This is a common problem in projects that work their accounting within one line of authority and the programming and administration in another. This problem must be resolved internally or project implementation will be constantly hobbled.

c. Upgrade the Technical Capability of Project Staff:

There are two personnel issues impeding implementation of the ATT project. First, there is a serious shortage of technical personnel to support the project; the original design called for 24 technical specialists, while at present there are only five such specialists.

Second the ATT project appears to have a number of persons assigned to it who have specialty areas (e.g., land reform) that are only marginally related to the project's objectives. Also, there are personnel assigned to SENEAGRO who actually work elsewhere in MIDA. The Evaluation Team recommends that USAID/Panama and MIDA carefully assess the current staffing pattern relative to actual project needs, and that appropriate adjustments be made to ensure that the project is not saddled with informal staffing arrangements.

d. Collaborative Programming of Extension Activities

Involvement of the private sector, particularly farmers and farmer organizations, in planning and evaluating a technology transfer program is essential. This has not been supported by administrators within MIDA. The Team recommends that MIDA establish a firm policy to involve farmers and farmer groups and private sector agri-businesses in planning, implementing, and evaluating local extension/technology transfer activities.

The changing market environment dictates that the ATT project work with farmers to identify market opportunities and requirements, and ensure a balanced program of demonstrations for technologies relevant to market conditions. Technical expertise in marketing and production economics is needed to assist farmers in evaluating market potentials and technologies for tapping these potentials. Strong interplay with the private sector will assist the project in developing its "market led" approach.

The foregoing discussion focused on the immediate steps that need to be taken to improve the ATT project's performance and to further develop and test the project as a model for an operational agricultural technology transfer system. The Evaluation Team recommends that the GOP, in collaboration with USAID/Panama, establish a timetable according to which the GOP/MIDA will take action in each of the four problem areas identified above. To this end, the Team recommends that USAID/Panama should condition 1987 funding until the GOP/MIDA have established this essential timetable for institutional reform. Further, the Team recommends that any faltering on the part of the GOP/MIDA in meeting the timetable's target dates for institutional reform should be interpreted by USAID/Panama as sufficient cause for appropriate action (e.g., not reimbursing vouchers until the reform in question has been implemented).

However, beyond these immediate actions, the Team believes that the GOP and MIDA should seize this opportunity and begin to take the decisive action needed for implementing the full range of institutional reforms that will be required if MIDA is to be successful in developing as a depoliticized national agricultural extension service.

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Chapter I INTRODUCTION

A. An Introduction to Panama's Agriculture

Panama is in a privileged location with access to world trade and commerce. It borders both the Atlantic and Pacific Oceans, and is the land bridge between Central and South America. The country's climate is tropical, broken only by the more temperate weather of the central mountain range.

Panama is a narrow isthmus 480 miles long, and between 35 and 110 miles wide. Most of the 7.7 million hectares are hilly, with only 2.2 million (29 percent) used for agriculture (1980). Crops are produced on 16 percent of the agricultural land, pasture is on 57 percent, and remaining land is used for other purposes (e.g., fallow).

More than 80 percent of the farmland is held by single proprietors. Government owned farms (such as citrus, banana and African palm plantations) account for 5 percent of the land, asentamientos (government established communal farms) account for 3 percent, and cooperatives account for 1 percent. By 1981, 34 percent of the land had been titled.

Over 90 percent of the farms in 1980 are less than 50 hectares; however, they account for only 8 percent of the agriculture land. At the other end of the spectrum, 1 percent of all the farms hold over 34 percent of the agricultural land.

The agricultural sector employs a significant amount of the country's two million people. According to a 1986 study by USAID/Panama, the agricultural sector is the most important source of both employment and entrepreneurs in the private sector. Approximately 28 percent of the population was employed in agriculture in 1980 (as compared with 50 percent in 1960). In the rural areas of the country, where close to 50 percent of the population lives, the dependence on agriculture as the primary source of income is much greater.

The agricultural sector, including agro-industries, contributed 16.9 percent to the country's GDP in 1984. The most important agricultural commodities, in terms of contribution to agriculture's GDP (including fisheries and forestry), are bananas (26 percent); beef (10 percent); rice (9 percent); sugar cane (4 percent); and coffee, shrimp, and pork (3 percent each). Agricultural exports are, by descending order of importance, bananas, shrimp, sugar, coffee, fish meal, fruit extracts, and hides and beef. The agricultural sector also produces a surplus and in 1984 it contributed 85 percent of merchandise exports.

During most of the 1980's, the agricultural sector (as well as the rest of the private sector) has experienced almost no growth. The performance of the sector has been declining since the 1960's. During that decade, agriculture grew at an annual average rate of 5.6 percent. By the 1970's, this had fallen to 1.7 percent. The GDP as a whole grew at an average of 6.0 percent during the 1960's and 4.5 percent during the 1970's.

Productivity levels in the agricultural sector are low, in general. A comparison of yields for major crops in Panama, Colombia and Costa Rica in 1980 illustrates this. Rice yields in Panama were 58 percent of those in Costa Rica, 40 percent of those in Colombia, and slightly less than the average in Latin America. Maize yields were 64 percent of those in Costa Rica, 72 percent of those in Colombia, and 51 percent of the average for South America. Of 16 commodities listed in a recent study, only cassava, onion and tobacco yields were greater in Panama than in Costa Rica.

Panama maintains a fixed exchange rate with the U.S. dollar and, in fact, does not have a central monetary authority. This has provided important stability for the exchange rate and has encouraged the development of the country's service sector and foreign investment. However, the country has not been immune to structural inflation nor to an overvalued exchange rate. One result of this has been that the terms of trade have turned against agriculture. The GOP in the past has intervened extensively in the market to offset this.

Panama faces a high external debt and in August 1985 the terms of the second structural adjustment loan from the World Bank were made public. Although the total amount of the debt continued to increase throughout 1985, the deficit in the current account has been gradually declining over the past several years. In addition, the GOP has begun to respond to an earlier structural adjustment loan by closing several state owned enterprises, and changing or removing price controls on some agricultural commodities. In March 1986, the Agricultural Incentives Law (Law 44) was passed to set the stage for the continued deregulation of the agricultural sector. This law replaces an earlier one that had opened the door to intensive government interference.

B. The Agricultural Incentives Law (Law 44) and the Five Year Plan for the Agricultural Sector

In the past six months a new Agricultural Incentives Law (Law 44) and a Five Year Plan for the agricultural sector have come into existence. The Agricultural Incentives Law replaces an earlier (1982) law that provided for considerable government intervention in the agricultural sector to promote self-sufficiency and import substitution. The intention of the new law is to promote policies that will decrease the amount of government interference and begin to move the sector toward a more efficient use of resources. Law 44

calls for (a) increased planning and the gradual elimination of protectionist policies; (b) abrogation of self-sufficiency, import substitution and guaranteed profits as official policies; and (c) increased emphasis on research and technology with a particular focus on exports. However, few substantive changes in the protectionist laws that affect the sector have been made, and IMA and MIDA retain their power to control the export and import of agricultural products and to set prices.

The Five Year Plan for 1986-1991 in many ways is an elaboration of Law 44. The specific goals of the sector, as specified in the plan, are (a) to contribute in a dynamic form to the economic growth of the country through the generation of income; (b) to increase productivity and efficiency of resource use such that the cost of living is reduced; (c) to improve the economic and social well-being of the population; (d) to contribute to the generation of employment in rural areas such that there is a reduction in migration to the metropolitan area; and (e) to improve the protection of the environment and the conservation of natural resources.

The Plan presents five strategic programs and three support programs to further these goals. The first program is to improve agricultural productivity. This program is directed at the components of the public sector involved with agriculture; the private sector is not mentioned. The first component is agricultural research, with IDIAP identified as the primary entity through which the GOP will work. The objectives of IDIAP presented in the plan are the same as those in the law that created the Institute. The Five Year Plan further specifies the commodities with which IDIAP will work. These include basic grains, horticultural crops, agroindustrial crops, fruit crops, root crops, and cattle. The Plan calls for the continued emphasis on basic grains, as well as a new push toward commodities for export. IDIAP also is to increase its involvement in environment-related research.

The second component is extension, technical assistance, and production. The foundation for this is SNCTTAT, the National Service for Training, Transfer of Technology, and Technical Assistance. SNCTTAT is to be located within MIDA (the Ministry of Agricultural Development). Four "fundamental ideas" which form the basis of SNCTTAT are presented in the documents: (1) training and transfer to producers and others who work in technology transfer; (2) the norms for SNCTTAT are the responsibility of those at the national level, while the implementation of the program is the responsibility of the regional levels; (3) methodology for training and the transfer of technology will be the responsibility of the Directorate for Training and Transfer of Technology; (4) the directorates at the national level that provide assistance to SNCTTAT are crops, livestock, fisheries, irrigation and drainage, etc.

IDIAP is to generate technical packets of information to be analyzed by a Committee of Technical Liaison that is composed of representatives from IDIAP and MIDA.

C. USAID/Panama Agricultural Sector Projects

This report focuses on an evaluation of two USAID/Panama projects in the agricultural sector, the Agricultural Technology Development (ATD) project and the Agricultural Technology Transfer (ATT) project.

1. The Agricultural Technology Development (ATD) Project

The Agricultural Technology Development (ATD) project (525-0180) has been underway since September 1979. The purpose of this project is to assist the Panamanian Agricultural Research Institute (IDIAP) in establishing an agricultural research capability that will help small to medium farmers increase their land and labor productivity and ultimately their employment and income opportunities. Emphasis is given to adapting, to Panamanian conditions, agricultural production technology that has already been generated in other parts of the world. The strategic approach under the ATD project is to strengthen IDIAP's institutional capability and to focus research on eight geographic priority areas in the country.

Project implementation was evaluated in 1983, to identify and correct any technical, administrative, or procedural problems which had arisen and impeded effective project implementation. Originally designed as a five year project (US\$7,000,000 project), the ATD project was extended for another three and a half years (with US\$4,200,000 added to the project).

2. The Agricultural Technology Transfer (ATT) Project

The Agricultural Technology Transfer (ATT) project (525-0227) was initiated in 1982, with a life of project of 7 years and a funding level of US\$7,500,000. The ATT project was designed to establish a national agricultural technology transfer system that would reach Panamanian farmers through local extension Agencies and other technology transfer (extension) methodologies. As the first phase of a proposed national technology transfer system, USAID/Panama is working with the Ministry of Agricultural Development (MIDA) to provide small and medium farmers in Chiriqui province with a continuous flow of adapted agricultural technologies and improved practices. Two additional Agencies (Parita in Herrera and Tres Quebradas in Los Santos) were later included in the project' geographic area of coverage.

Technology transfer is carried out by MIDA through local extension Agencies. These Agencies are under the executive authority and control of MIDA's Regional Directorates (RDs). Responsibility for project implementation has been delegated by MIDA to these RDs. Subsequent to the initiation of the

project, the Servicio Nacional de Extension Agropecuaria (SENEAGRO) was established as a normative institutions, with the function of providing the RDs with policy guidance on agricultural extension and representing the extension service within MIDA's national structure.

D. Purpose of Evaluation

This report presents the findings, conclusions, and recommendations of the Panama Agriculture Technology Development and Transfer Evaluation. The stated purposes of this evaluation are:

1. To assess the general progress to date under the Agricultural Technology Development and the Agricultural Technology Transfer projects and their respective lead institutions (IDIAP and local Agencies of MIDA under the normative direction of SENEAGRO).
2. To assess ways to assure an adequate supply over the long term of viable agronomic technology and the transfer of same to producers.
3. To provide a strategic context for agricultural technology development and transfer within the Mission's agricultural strategy.

The Panama Agriculture Technology Development and Transfer Evaluation has been characterized as what may be called a cluster evaluation, in that a single Evaluation Team simultaneously evaluated the ATD and ATT projects as two highly-related projects. This cluster evaluation, through its analysis and recommendations, addresses the stated purposes of the evaluation in the following ways.

First, this evaluation focuses on agricultural technology development and transfer in an integrated fashion, such that recommendations for improving agricultural research (technology development) can only make sense in the context of improving the system for agricultural extension (technology transfer). In this perspective, unless the whole system of agricultural extension, research, and education is brought along, obstacles in one area will impede or block progress in another. Here the evaluation is concerned not only with delineating what Panama's ATD&T system should look like but also with recommending how to reach this goal. The evaluation provides specific recommendations for improving each of the two projects as well as Panama's ATD&T system in general.

Second, the evaluation focuses on the conditions that are essential for enhancing the productivity and sustainability of Panama's ATD&T system. Thus, for example, two essential conditions for or "inputs" to ATD&T are trained people and funds. An ATD&T system can only be productive if there is a continuous flow of these resources into the system. If sustainability cannot be established, it cannot be expected that an ATD&T system will be able to

continue to develop after USAID/Panama funding ceases. To ensure this continuous flow of resources to support the development of an ATD&T system requires the development of self-perpetuating systems for the provision of trained people and funding support.

Third, and finally, the evaluation focuses on the draft USAID/Panama agricultural strategy and considers how the current ATD&T system in Panama contributes to this strategy's goals and how an improved ATD&T system will help Panama and USAID/Panama to increase the productivity and income-earning capability of Panama's farmers.

F. Scope of Work

The scope of work (or statement of work) for the Evaluation is presented in Annex A.

G. Evaluation Methodology

The evaluation was conducted by an Evaluation Team consisting of six persons as identified in Annex B. The Team was assisted during the evaluation by various USAID/Panama officials, including the Director, Office of Agriculture (Mr. David Schaer), the ATD project officer (Mr. Don Drga), the ATT project officer (Mr. Rudy Vigil), and the Evaluation officer (Mr. Frank Pope). Based on the team's initial discussions with these USAID/Panama officials, including a two-day evaluation planning conference in which key Panamanians associated with these projects also participated, the team's co-leaders developed a draft outline of the final report. This outline was then reviewed with the Team members and, after being revised, each Team member was assigned certain areas of responsibility for data collection, analysis, and report drafting.

Information for the evaluation was obtained through reading of available documentation and interviewing of numerous persons. Interviews were conducted not only in Panama City but also throughout the country at various locations relevant to the implementation of project activities. Given the limited time available for the collection of data in the field, the Team divided itself into two sub-groups, with one group (Dr. Jean Sussman, Dr. Jerry Grant, and Dr. Robert Waugh) focusing on the ATD project, while the other group (Dr. Kerry J. Byrnes and Dr. John Claar) focused on the ATT project. The sixth team member, Dr. Margaret Sarles (USAID/Washington, Latin American and Caribbean Bureau/Office of Development Resources), participated in the evaluation planning conference and the Team's early discussions on how the scope of work could be most productively accomplished and the relevant material organized into a final report.

II. AGRICULTURAL TECHNOLOGY DEVELOPMENT (ATD) PROJECT

A. Introduction

The purpose of this evaluation of the ATD project is four-fold. First, it is to provide information on the project's specific accomplishments. Second, it is to examine the most important constraints impeding the project's implementation. Third, it is to examine the original objectives of the project and determine if they should be modified to reflect changes in IDIAP and in Panama's agricultural sector. And fourth, the purpose of this evaluation is to make concrete recommendations on how the impediments to implementing the project can be overcome, thereby increasing the probability of the project's success.

Prior to presenting the evaluation's findings, two important points should be made about agricultural research and about this evaluation of the Agricultural Technology Development project. First, agricultural research primarily is a public sector responsibility, and should remain so. Agricultural research is a public good that is essential to the development of Panama's agricultural sector. The fact that agricultural research is a public good means that the private sector will not necessarily invest as heavily as is required, nor will it necessarily invest in the areas that are most important for the country's development. This does not preclude encouraging a greater involvement in agricultural research on the part of private producers, input suppliers and agri-business firms involved in the agricultural sector. On the contrary, as is demonstrated throughout this paper, the participation of the private sector should be strengthened. However, the continued leadership and predominance of the public sector in agricultural research is required.

The second important point is that many of the effects of agricultural research on production and agricultural income will take years to realize. The fact that the ATD project has been in operation for less than ten years limits the measurements of success that might be used as indicators of the project's impact on agricultural income, productivity, and prices. Thus, the Evaluation Team has concentrated its work on the more micro effects which the project has had on the experiment stations, participating farms, and the offices of IDIAP.

The project has two primary objectives: first, to increase the productivity of labor and land of the targeted producers through the development and dissemination of agricultural technology; and second, to strengthen IDIAP's institutional capabilities through the training and expansion of the Institute's staff, and the provision of physical support facilities. The original emphasis of the ATD project is on the adaptation and dissemination of technologies developed outside the country, not on the generation of new technology. The research is to be field-oriented, as compared with experiment station research. In fact, the project paper calls

for 80 percent of the research to be conducted in farmers' fields. This requires that the farmers become directly involved in the development and dissemination of the technology, and that IDIAP adopt a multi-disciplinary approach to conducting research, both at the experiment stations and on the farms. Extensionists must be included in the on-farm work of the researcher.

The project paper foresees four indirect benefits stemming from the ATD project: (1) a reduction in soil erosion; (2) lowering the cost of food; (3) a net increase in foreign exchange earnings through a reduction in food imports and an increase in exports; and (4) a reduction in post-harvest losses.

The project has been underway since September 1979. Originally intended as a five-year project with a budget of \$7 million, the project was extended for three years and awarded an additional \$4.2 million.

B. Organizational Structure:

IDIAP was created in 1975 by Law 51 as an autonomous public sector institution. IDIAP's mandates are (1) to coordinate the development and transfer of agricultural technologies; (2) to work with small and medium sized producers; (3) to oversee and utilize agricultural resources rationally; (4) to increase agricultural production and productivity for domestic consumption and export; and (5) to contribute to expanding the agricultural sector and to the development of priority geographic regions.

As an autonomous institution, IDIAP responds not only to the Ministry of Agricultural Development (MIDA), but also to the Office of the President and the Ministry of Planning and Economic Policy (MIPPE). The Director of IDIAP is named by the President, (although typically the person selected is nominated by the Minister), and IDIAP submits its budget for approval directly to MIPPE, not indirectly through MIDA.

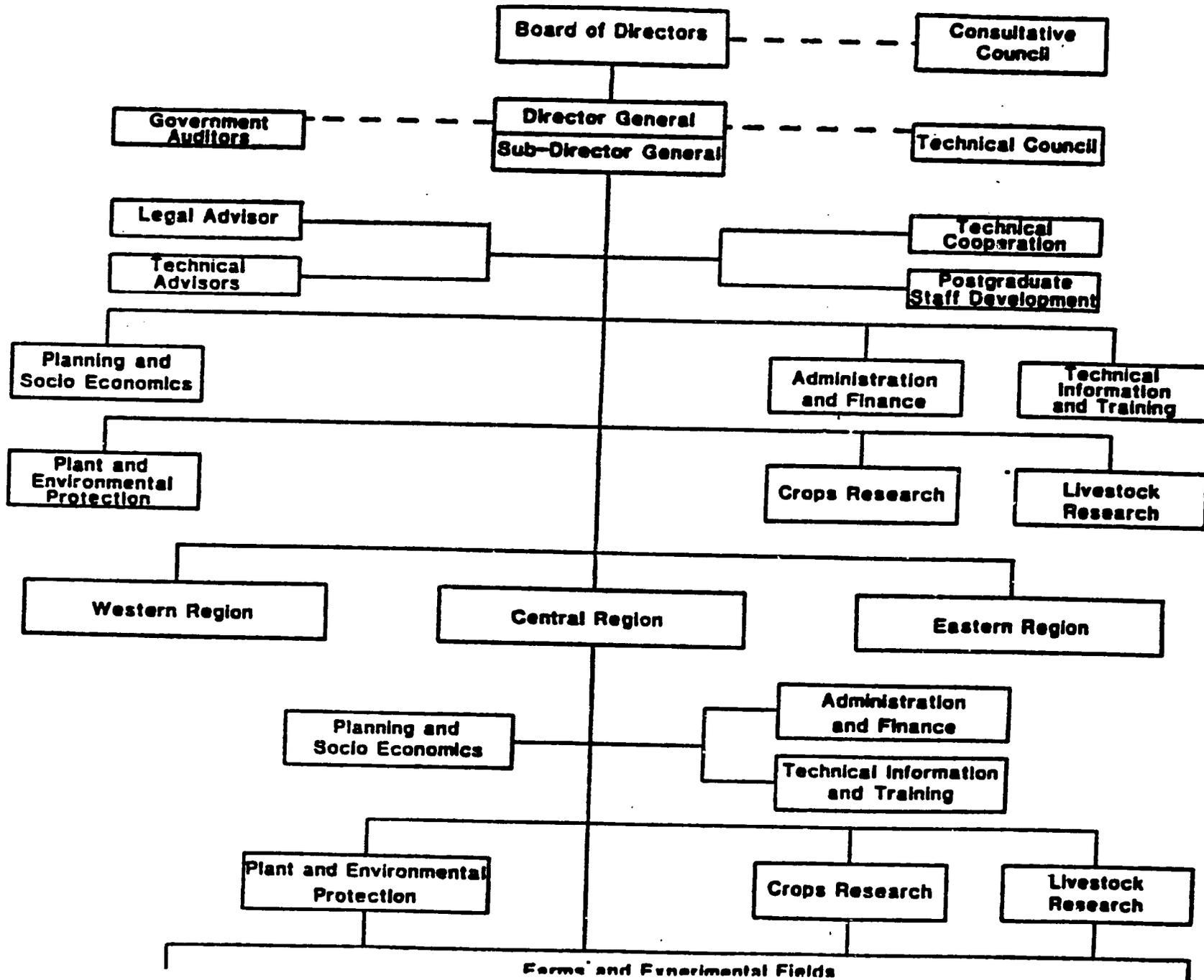
By law, IDIAP has been given certain privileges intended to promote its success. For instance, it has a tax exempt status, and it establishes its own operational rules and is responsible for all staffing decisions. In 1986, the Institute also was assigned jurisdiction over ENASEM, the semi-defunct National Seed Company.

Diagram II-A illustrates IDIAP's current organizational structure. The Institute's headquarters are located in Panama City. In recent years, IDIAP has delegated authority to the field offices and the Institute continues to look for viable ways to allocate increased planning, financial, and research responsibilities to the regional offices and the experiment stations. IDIAP has three regional offices, one located in Panama that covers the provinces of Panama, Colon, Darien and the Comarca of San Blas. An office located in Santiago covers the central provinces of Coclé, Veraguas, Herrera and Los Santos. The western regional office located in David covers activities in Chiriqui and Bocas del Toro. Each of the regional offices, in turn, supervises various experiment and field stations.

Panama: Organigram for I.D.I.A.P 1985

Diagram II-a

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IDIAP's top administrative level is the Directorate General, governed by a Board of Directors (Junta Directiva) and the Director General of the Institute. The Board of Directors is comprised of three members-- the Minister of MIDA, the Dean of the Faculty of Agronomy of the University of Panama (the FAUP), and the General Manager of the Agricultural Development Bank (BDA) or a designated person. The General Manager of the BDA and the Minister of MIDA are appointed by the President of the country; the Dean of the FAUP is elected by the students and staff of the Faculty of Agronomy. According to Law 51, the Board has authority to approve the National Agricultural Research Plan; approve the budget; approve international agreements and the hiring of foreign researchers; and name the directors of the experiment stations. The Board is mandated to meet monthly, and when asked to meet by the Minister of MIDA. It has met only three times in the last five years.

The Board of Directors and the Director General of IDIAP are supposed to be advised by a Consultative Council and a Technical Council. The Consultative Council is composed of five people designated by the Board of Directors: a representative from a private livestock operation and from a private crop operation, a representative from a state owned agricultural enterprise, a representative from campesino organizations, and a representative from the agricultural professions. This Council was mandated to provide advice on the National Plan for Agricultural Research and on the budget, to inform the Institute about priority research areas, and to analyze problems brought to its attention by the Board. It is to meet by decision of the Board or of the Director General. In fact, it does not meet at all.

The Technical Council is intended as the in-house advisory council to the Director General. Its purpose is to provide the Director General with advice in such matters as personnel, salaries, scholarships, and most importantly, the National Plan for Agricultural Research (el Plan Nacional de Investigacion Agropecuaria). The members are chosen by the Director General for a period of three years.

The Directorate of Planning and Socio-Economics is primarily responsible for preparing the annual budgets (and the necessary revisions). The Directorate provides the necessary economic and social data required for defining policies, setting priorities, and assisting the other units of IDIAP with designing experiments and feasibility studies of the new technologies. In addition, the Directorate is supposed to conduct area diagnostic studies and evaluate research activities. The Directorate comprises the Departments of Planning and Evaluation; Statistics and Mathematics; and Computation.

The Directorate of Administration and Finance is responsible for managing the budget, accounting, purchasing, and other related services. Its two operating units are the departments of finance and administration. The Directorate of Technical Information and Training was formed in 1984, when the function of extension was removed from IDIAP. This Directorate is responsible

for IDIAP's publications, its library and documentation facilities, and in-service training of personnel.

The Directorate of Crop Research and the Directorate of Livestock Research are responsible for all commodity research programs. Livestock research is involved almost exclusively with beef and milk production, with the exception of a small on-farm goat research program in Chiriqui.

IDIAP's administrative staff appears well trained and knowledgeable about the administrative, budgeting and planning needs of a research organization.

Problems and Constraints

IDIAP's organizational structure gives the impression that the Institute is an autonomous agency with an administrative structure that guides the Institute in the direction of making the best decisions for Panama in matters concerning agricultural research. Nonetheless, there are major impediments that have a deleterious effect on the functioning of the organization.

The Board of Directors (Junta Directiva) has met only three times in the past five years. This affects the policy-making environment at IDIAP and fails to take advantage of this natural point for positive interaction between the three organizations. Another albeit lesser problem is that the Consultative Council does not meet regularly. Thus neither the Director General nor the National or Regional Directorates receive the policy and planning support services needed for the effective management of IDIAP.

Faced with the assumption of these duties as well as those of the moribund Board of Directors, and the routine administrative and political duties of the position, the Director General is forced to concentrate his energies on day-to-day management of the Institute. Policy formulation and planning is delegated to the lower levels of the organization that are likewise overburdened with daily management tasks.

An active Board of Directors supported by appropriate staff from the member institutions should manage the policy agenda for the institution and the sector. In like fashion the Board could provide the optimum forum for the formal discussion of the integration of agricultural teaching, research and dissemination. As the official linkage of these three activities is the cornerstone of a functioning public sector Agricultural Technology Development and Transfer (ATD&T) system, this nexus of authority should be seriously considered for the responsibility of developing the policies and devising the broad plans for formal integration of the system. If such an initiative is taken this would be an appropriate activity to receive expert advice under the technical assistance contract.

The importance of finding a forum for this discussion can be illustrated by this excerpt from the July 1983 evaluation of this same project*:

"A program to generate appropriate technology and to successfully transfer and incorporate it into the small and medium farmers production system is extremely difficult under ideal conditions. The development of successful methodologies in which dissemination activities flow logically from the research/validation effort becomes even more complex and difficult when the major responsibilities for the two activities are divided between two institutions, as is the situation in Panamá in which IDIAP has the responsibility for research/validation and MIDA has the responsibility for dissemination. The system is further complicated when the extension/credit responsibilities are included.

For the proposed strategy to be successful, close linkages must be developed and maintained between IDIAP/MIDA/BDA at both the personnel and institutional levels. Personnel of MIDA and BDA must be involved with the research teams from the beginning so that they may participate in the planning and implementation of the research validation of new crop and livestock technologies...

Unfortunately, to date this IDIAP/MIDA/BDA linkage has not been developed. Occasional examples of successful collaboration are observed. These linkages are generally based on personal relationships and mutual respect between IDIAP/MIDA/BDA personnel. However, these examples of collaboration between IDIAP/MIDA/BDA personnel are much too rare to expect significant impact outside of their very limited zones of activity. If there is to be any hope of project success in the generation and transfer of appropriate technology that benefits the farmer and the country, an approach must be found to institutionalize this linkage...

...the evaluation team is united in their belief that successful collaboration will never develop until there is an organized and concerted effort to promote collaboration and a plan for accomplishing this task, and that this effort must be initiated, implemented and sustained at the highest levels of responsibility within these institutions."

*Report of the Evaluation team on the ATD project by the International Agricultural Development Service - Page 49 & 50.

C. Programming:

In 1979, IDIAP established a plan to develop the organization's research program. The plan included five principal goals: (1) to improve facilities; (2) to attract and train a cadre of personnel; (3) to develop applied research at the experiment station and the farm level; (4) to focus on small- and medium-sized farmers; and (5) to contribute to agricultural production.

This plan was appropriate for the needs of a newly formed institution. However, over the years IDIAP should have moved into the delineation of research priorities. In fact, it did not. The result is that IDIAP expanded into too many commodities and continued to work on the original food grain crops. IDIAP did not force itself to carefully define priorities and to limit commodity production to the increase in its operating budget and research support. In recent years this has produced a widely dispersed research effort.

In late 1985 a commission within IDIAP, together with the technical assistance team from Rutgers, prepared a statement of objectives and strategies for the Institute, entitled "Final Report of the Commission on Objectives and Strategic Guidelines" ("Informe Final de la Comision de Objetivos y Lineamientos Estrategicos"). In terms of research priorities, the report refers to general areas of research, but little about what could be considered to be priorities. The document states that IDIAP should "continue to improve the productivity of different agricultural commodities" especially (1) those that form a part of the basic family market basket; (2) nontraditional and traditional exports; (3) import substitution commodities; and (4) commodities with potential for agroindustry. Cattle production is emphasized, as is research in horticulture and fruit trees. This approach appears to be much too broad considering the resources available to IDIAP.

The Evaluation Team feels that while this is an excellent effort to explain IDIAP's current research efforts, it does not go far enough to define priority areas and to specify where IDIAP should be focusing its scarce resources. The areas of research mentioned in the document are too broad to permit the sharp focusing of IDIAP's resources on specific objectives.

The Team recognizes that IDIAP is severely hindered in developing priorities by the uncertain policy climate of the agricultural sector. The recent Five Year Plan for the sector provides some guidance on the policies of the GOP, and IDIAP should incorporate the relevant parts of it into the framework for establishing priorities. It should make every effort to limit the work load to a level of effort that can be adequately supported.

Priority establishment is essential for the development of a research institution. It also is one of the most difficult exercises that a research institution can undertake because the agricultural sector of any developing country typically is faced with an almost overwhelming set of production-related problems. This situation often is compounded by considerable policy uncertainty and sharp disagreements on how these problems can be solved.

Research planners need to be aware of the goals and policies established for the agricultural sector, and the resulting environment shaped by prices, markets, and infrastructure in which agricultural producers must operate. To establish priorities, the research institution must interpret carefully government policies and market factors and then integrate the key ones into an operating framework. This is important basically at two levels. First, farmers use economic criteria when making decisions. Thus, they will adopt a technology when it is more profitable than alternative ones. And at a second level, a public sector institution, dependent on the government for fiscal support, must be careful to cultivate financial backing. Being too much at odds with official policy may result in cutbacks in funding. The best way for the organization to justify its budget request is to specify clearly how the proposed research will contribute to the government's goals and policies. Further, establishing priorities provides useful information to other institutions involved in the development and transfer of technology by providing a base from which the coordination of activities can begin.

The establishment of priorities is necessary to facilitate the most efficient use of resources—human, physical and financial. An important aspect of this is the hiring and training of staff in order that capable personnel are available to meet the needs of the institution. IDIAP currently is at a stage in its development where this is very important. In the absence of clear research priorities, research efforts tend to become too dispersed, with the result that resources are insufficient to succeed in any single research endeavor.

Related to this is the necessity to be able to identify the sources of technical information and assistance that can best meet the needs of the institution. The research institution must be able to specify and request the

assistance it requires, and not merely be the recipient of assistance as determined by external donors.

Well-defined priorities also give an organization a sense of mission around which its personnel can focus their efforts. As stated in the preceding section, the Team feels that this sense of mission is lacking within IDIAP. Researchers need to feel that they are making a significant contribution to the research effort; an understanding how their work specifically relates to the general priorities of the organization is essential. In the absence of priorities, researchers select problems as they individually perceive them, or proceed according to their personal interests. This results in a series of individual research programs that are not united in their purpose, that often may be at odds with each other, and that may not be focusing on the most important production-related problems. Further, the lack of priorities impedes the role of management-- directing individual researcher's work efforts, as well as the overall direction of the organization is difficult if there are no priorities to be used as a guide for management.

Once priorities have been established, the research institution must turn to the designation of the specific objectives and strategies that lead to the attainment of the priorities. Research objectives are the subset of specific questions related to a priority for which solutions are needed. Strategies describe how the institution will proceed to solve these questions. For instance, IDIAP and various consultants have identified livestock production as a priority area. Within this general priority area, specific objectives include nutrition, production, economic research and export constraints. Thus, objectives can encompass biological, economic and institutional components. The strategies, then, as defined by Moran and Hertford, provide the researcher and research planner guidelines for accomplishing the objectives.

Recommendations

- a. IDIAP should specify its research priorities immediately. In recent years several excellent studies have been made that provide IDIAP information on which commodities (or commodity areas) should receive priority attention. In order to establish a clear set of priorities, IDIAP could combine the information in these studies with the goals of the GOP and its own analysis of the areas in which it should be undertaking major research efforts.

D. Budgeting and Finance

1. The Budgeting Process

The annual budgeting process for IDIAP's staff begins in June. (The GOP's fiscal year is the calendar year.) The process starts with the elaboration of a preliminary budget, based on an elaborate document entitled the POA, or Annual Operating Plan (Plan Operativo Anual). The budget is

submitted to the Ministry of Planning and Economic Policy (MIPPE). Participation in the design of the preliminary budget is from the base up-- researchers at the experiment stations draft proposals for their work during the upcoming year and submit the proposals to the regional offices. The regional directors, together with the regional planners, review these proposals and submit regional budgets to the central office. From there the Institute's preliminary budget is formulated and sent to MIPPE. Feedback from the regional levels to the experiment stations is informal. It depends on the communication channels established between the regional directors and their staff over important points made about the POA. First, the POA is elaborated before the results of the current year's experiments are known. Thus, the operating plan for the following year is based on research results from the preceding year-- a two year difference. And second, and in part due to this, the POA is not a work plan-- it is a long, general, guide to the Institute's research and financial objectives for the coming year.

MIPPE takes IDIAP's preliminary budget, as well as those of the other state entities, and prepares a national budget which is submitted by the end of August to the National Assembly. Usually there is a meeting between MIPPE and IDIAP to discuss any changes in the budget. However, if MIPPE is pressed for time, this meeting may not take place.

The national budget is not approved until the end of the year. Consequently, in most years, IDIAP does not know what its budget will be until the year has already begun. In addition, the fact that the budget has been approved does not ensure when money for IDIAP (or for any other government entity) will be forthcoming. In fact, in 1985, IDIAP did not receive any non-salary operating funds from the national government until April-- because the national budget was not approved until then.

The effects of the delay in the receipt of funds are devastating for the regional offices and experiment stations. Crops must be planted, and inputs applied on schedule if research is to be meaningful. In some experiment stations in 1985, no funds from IDIAP's budget arrived until July. In one experiment station that the Team visited, only 50 percent of the allocated funds had arrived by November 1985.

Disbursement of counterpart funds for the project is often delayed, resulting in the cancellation of experiments already in progress or not yet started. That inputs essential for research (including gas) do not arrive or arrive too late precludes doing the research correctly. Moreover, this compromises the ability to interpret the results or evaluate the research properly.

In 1986 IDIAP's regional offices were given control over the funds generated by the research stations in their areas. Instead of returning the funds to the central office as in previous years, they are intended to be used to cover immediate operational expenses. The funds are not a large sum in most cases. The national headquarters reports that inadequate control over the use of the funds exists in some areas of the country.

2. Composition of the Budget

A breakdown of IDIAP's budget indicates that approximately 88 percent of the total budget in 1985 and 1986 was allocated to salaries. Total salary costs are the sum of "personnel" and "other" costs, where "other" encompasses the costs of maintaining the five National Directorates, including per diems, social security payments, and travel costs.

Thus, only about 12 percent of the budget is scheduled for non-personnel expenses. And of this 12 percent, only 7 percent is allocated for inputs into research, gasoline, and maintenance of equipment and vehicles. Once the gasoline and maintenance costs are deducted from this figure, only about 5 percent remains to cover the cost of agricultural experiments-- the primary responsibility of IDIAP.

3. Recommendations

- a. The GOP must take increased responsibility for recurrent costs. The sustainability of the project is a key issue to be resolved and AID must be assured that the funds will be made available on a timely basis.
- b. The innovative research arrangements developed with the cooperative in Boquete, and the banana and plantain producers in Chiriqui and Bocas del Toro are examples of how the private sector can take an active role in the development and transfer of agricultural technology. Under this arrangement these two farmer organizations provide partial financial support in the form of farm inputs. The Team recommends that USAID/Panama and the GOP work with the private sector to develop additional arrangements for supporting agricultural research and the transfer of technology.

Members of producers organizations and input suppliers have stated to the Team that they would like to cooperate in the development of the agricultural sector. Other groups, such as those involved in marketing, transportation and finance also should be including in the development of such arrangements.

E. Planning: Development of Work Plans

1. The Annual Operating Plan (POA)

IDIAP currently develops what is called the Annual Operating Plan, or POA (Plan Operativo Anual). Its principal purpose is to provide information in support of the budget and to document institutional activities that can be compared to long term planning objectives..

The POA is a major work, the 1985 issue is in two volumes that total 790 pages. It is organized by program, sub-program, and project; and contains summaries of the work to be carried out by each implementing unit (e.g., region and experiment station). Also cost estimates, including administrative costs and overhead, are assigned proportionately to each experiment. The two volumes contain a lot of very important and useful information. They are good references showing the kinds of work that the Institute does. And they are well done and show a considerable amount of effort.

The system of relying on the POA has two serious defects however. One is that the most recent research results are not used when developing the POA. A second defect is that there is no system of research evaluation, group participation, or discussion of research planning at the field level. This results in one research program being largely uninformed about other programs. In addition, neither extension nor other client groups are involved in the development of the POA.

Research plans that are unilaterally developed for a single commodity or discipline group, that are not questioned by peer groups, and that do not include the participation of clientele in their elaboration tend to be less focused on specific objectives as they ought to be. Such plans may even fail to adhere to institutional priorities and policies. This impedes the ability of a research organization to solve its most important problems.

Recommendation: Develop a Work Plan (Plan de Trabajo -PT)

The Evaluation Team recommends that the POA be simplified and that a Work Plan (Plan de Trabajo -PT) be developed. The POA would continue as the basic document in support of the budget and could contain the lists of experiments showing kind of research, the location, and estimated costs by program and sub-program.

The PT could be developed in January and February, after the POA. The PT would be the plan of activities to be conducted in each farming area where IDIAP is active. Preparing the PT in January and February would allow time for the researchers to evaluate and discuss the most recent experimental results with their own research groups, as well as with colleagues working on other commodities and in other areas of the country. The PT would be a less formal publication than the POA. If it were published by region, the PT also could be available more quickly than the POA.

F. Technical Assistance

1. Long Term

Long-term technical assistance for the ATD project has been provided primarily through Rutgers University. In addition, CIAT, CIMMYT, CATIE, CIP, and other technical assistance organizations have been contracted under this project.

The Evaluation Team believes that the support provided by the technical assistance organizations has been effective. In the case of Rutgers University specifically, this assistance can be divided basically into assistance to the commodity research programs and advice to IDIAP's Director General.

The Team is impressed with the work of the horticultural and pastures researchers. There are many reasons to believe that the researcher in animal nutrition, who came to Panama in January 1986, will be equally successful.

The success of these programs has been due to the creativity, dedication, and research capabilities of these Rutgers team members and their ability to work effectively with their Panamanian colleagues. The onion project in Boquete (Chiriqui) deserves special mention because of the 50 percent increase in onion production in one year, and because onion production is being extended effectively into the wet season. In addition, IDIAP and Rutgers have established a unique working relationship with the cooperative that promotes onion production. An agreement was signed three months ago whereby the cooperative provides office space, land for experimental trials, and the inputs needed for the research. In return, the arrangement requires that the IDIAP researchers live in the area, and work on the production problems determined by a committee composed of private and public sector representatives.

Rutgers has facilitated the success of the research programs in several important ways. First, it has provided some short-term assistance to supplement the ongoing programs. Second, the scientists are young and highly capable professionals, which should encourage Rutgers to take necessary action to insure that these people remain with the University. Third, by using its association with other international organizations (such as ISNAR), Rutgers has furnished IDIAP and USAID with documentation, studies and services beyond those specified in the project paper. Noteworthy in this respect is the work done recently on proposed recommendations for establishing priorities for IDIAP.

The second area of Rutgers technical assistance thrust has been at the level of the national headquarters, primarily on policy and research organization. Here Rutgers has sought to establish research priorities, to organize and rationalize the administration of the Institute and to integrate internal review policies and procedures. In addition efforts have been made to improve research relationships with FAUP, and to increase what might be termed the "academic" orientation of the Institution. This has been done by establishing relationships with other faculties of the University located in Panama City. The Team believes that the technical team has worked well with IDIAP's staff at the national level, and the Team received favorable reports from IDIAP staff members in this regard.

Constraints and Limitations

The Team has identified five key constraints that have limited the effectiveness of the Rutgers technical assistance team.

First, IDIAP continues to work on too many crops. This forces IDIAP to limit the allocation of expert time on specific tasks and dilutes the effectiveness of the team. This strain on resources impedes the development of strong national commodity and discipline programs.

The pressures from many sources to work on a large number of commodities is understood. However, donor agencies and the providers of technical assistance do not always receive clear direction from IDIAP on the type of assistance most needed. In some instances this has resulted in donors and technical assistance teams telling IDIAP what will be provided, and not vice-versa.

A second constraint concerns the policy environment in which IDIAP must operate. Long term technical and institutional strengthening assistance is most effective when permitted to operate in a stable policy environment. Such efforts are impeded by frequent changes in government personnel and the lack of a clear government policy statement. Producers are more likely to accept a new technology when they can be relatively certain that the environment in which that technology has been tested (the economic as well as the agronomic environment) will remain fairly stable, and that information needed to help make rational economic decisions is accurate.

A third constraint is the weak linkage IDIAP has with the extension service and the BDA. Agricultural research and extension and credit form a continuum that cannot be separated. Yet this continuum does not exist here. The Evaluation Team believes that the providers of technical assistance to both the ATD and the ATT projects are not properly related in order to bring about and fortify this linkage.

A fourth constraint is that there has been a relatively high degree of turn-over in the Rutgers long-term technical assistance team. Frequent changes in expatriate staffing compromise the objective of providing continuity in the development of technical support to the project.

A fifth constraint is that the project originally was designed for only five years, subsequently extended to over eight. The Team feels that seven years is not sufficient to accomplish the goals specified in the project plan and that the original project should have had a minimum life of 10 to 12 years. This is particularly true because IDIAP was not a mature research organization when the project began. The relatively short life of the project may have impeded Rutgers from spending a greater share of its resources on endeavors that required a longer-term gestation. In addition, the short life of the project may require that researchers think about their next job, if they do not have a permanent institutional arrangement, while still in the midst of developing their projects in Panama. Thus, the short life of the project builds uncertainty into the institutional and research strengthening process.

Finally, a sixth constraint has been the lack of professional pride and sense of mission within the IDIAP professional corps. An important aspect of technical assistance should be to help IDIAP's administrators and staff develop a sense of urgency and responsibility toward their clients and the problems at hand. This is difficult to achieve when primarily political rather than technical conditions govern professional advancement, and the institution itself does not have clearly defined long term goals.

Recommendations

- (1) The technical assistance team should work closely with IDIAP during the process of establishing long and medium term research priorities as well as in the preparation of the annual work plans.

With clear priorities and the establishment of well organized commodity programs, IDIAP will be able to take full advantage of the resources available from international organizations, and the Rutgers team will be able to program their personnel much more efficiently.

- (2) Once the priorities and commodity programs are established, USAID/Panama and IDIAP must select appropriate technical leadership to join the Rutgers team immediately. This will insure that IDIAP's leadership and research staff will be supplemented properly by the technical assistance team.

Technical assistance should not be limited to the strictly technical areas, but to leadership and management areas which help guide the technical thrust. The Evaluation Team feels that IDIAP has weakened production-focused technical efforts by (1) assigning a large number of better trained scientists to the central office; (2) utilizing most of the economists as planners, and not as members of field-level interdisciplinary teams; and (3) assigning scientists too frequently to tasks (such as administration) that do not focus directly on production related problems.

- (3) Short-term solutions to long-term research and institutional problems usually are not effective and should be avoided. Continuity of effort and long-term institutional contracts should be arranged with a ten year minimum.

IDIAP in particular is still in its infancy. Personnel who are university graduates require 8 to 10 years additional training through the M.B. and Ph.D. degree levels and some field experience before they become seasoned researchers. Even more time is required for researchers to gain experience in administration.

2. Short-Term Technical Assistance

a. Current Situation: Accomplishments

The ATD project has utilized basically three types of short-term technical assistance: (1) Panamanian and foreign researchers brought in to replace IDIAP researchers studying outside the country; and (2) individuals brought in by Rutgers to fulfill short-term research objectives.

By 1984 IDIAP had hired 33 scientists on short-term contracts at relatively low cost to replace the Institute's permanent staff studying abroad. Many had Ph.D.'s and included both Panamanians and foreigners. Unfortunately, this short-term arrangement was cancelled in 1984 because the AID mission in Panama discovered that several of these short-term replacements were receiving salaries from other sources as well (usually the FAUP).

The second type of short-term technical assistance is provided by individuals who come to Panama for short term assignments to fulfill specific needs of the Institute. The ATD project provided for eight months of such assistance. According to USAID/Panama, these months were used by Rutgers to furnish short-term assistance to work with IDIAP to continue the Institute's strategic planning.

b. Recommendations

- (1) The Evaluation Team recommends that the program of short-term technical assistance where counterpart funds are used to hire local researchers as temporary replacements for IDIAP researchers studying abroad be reinstated. Specialists for short term assignments are more successful if they are used several times, over a period of years. During repeated assignments they can "hit the ground running". The local budget should not have to pay for a learning experience in the country of short-term technical assistance, therefore it seems much more reasonable that local talent be used whenever possible. Use of local personnel outside the project and/or from neighboring countries should be considered when qualified persons are available because of their familiarity with local conditions, shorter travel distances, and perhaps lower salaries.

G Personnel and Career Development of IDIAP's Researchers

1. Post-Graduate Training

a. Current Situation: Accomplishments

The staff of IDIAP has grown markedly since its inception. In 1976 30 employees had received university training. There were two Ph.D.'s (seven percent of those with university training), 11 MS's (37 percent of those with university training) and 16 undergraduate degrees (53 percent). By 1986, the total number of employees had risen to approximately 460, 132 with university training (29 percent). The number of Ph.D.'s has increased to nine (seven percent of those with university training); the number of MS's to 38 (29 percent), and the number with undergraduate degrees to 85 (64 percent). The table below presents the breakdown by educational level in 1976, 1980, 1982, and 1986.

Table I
IDIAP Staff by Academic Level, 1976, 1980, 1982, and 1986

Year	Total	Ph.D.	M.S.	I.A. or Lic.
1976	30	2	7	16
1980	64	5	13	42
1982	122	8	22	86
1986	132	9	38	85

(source: Wynter, p. 8)

To date, 19 students have completed M.S. training and five have completed Ph.D. training through the ATD project. Currently, four are studying at the M.S. level and two at the Ph.D. level. There has only been one failure at the Ph.D. level, and overall, 4 percent of the trainees who began advanced programs did not complete their degrees. This is a good record, one that indicates that scholars have been selected well. Based on the original project design, training is about two years behind schedule which is not surprising and should not be severely criticized as start-up time is required to choose candidates and to provide language training. Graduate training up to now has been very broad in scope: approximately 19 disciplines or study areas have been pursued. This broad approach has provided IDIAP with a needed critical mass of scientists.

As the table illustrates, the growth in the number of researchers also is notable because it did not occur until about 1981. In 1980, 13 people with university degrees were hired. In 1982, this number rose to 58. Thus, IDIAP is a relatively young Institute: in 1984, 56 percent of the Institute's researchers had five years or less of experience and 50 percent of the staff were 35 years old or younger.

This growth also is notable because it far exceeds that planned in the original project paper. The paper states that "IDIAP has programmed an expansion of its professional and technical staff from 45 to 95 during the five year life of the project" (p.33)— a doubling in size. By 1986 that number was 132, or almost a tripling in the size of the technical staff.

Table II presents the distribution of all staff by function; Table III presents the distribution of the technical personnel by region and education level.

TABLE II

Occupational Distribution of IDIAP Staff- 1984

<u>Occupation</u>	<u>Number</u>	<u>Percentage</u>
Professional	97	22
Technical	75	17
Management/Administration	29	7
Office Employees	51	12
Drivers	9	2
Support Personnel	16	4
Field Workers	162	37

(Source: Rochin et al. p. 29. Professional staff: with university degree; technical staff: without university degree.)

The percentage of the technical staff working on crops was 50 percent in 1984. The percentage working on livestock was 25 percent and the percent working on technology transfer and special programs was 15 percent (Rochin et al., p. 29).

Table III

Distribution of Technical Personnel by Region-- 1986
Offices

	<u>Headquarters</u>	<u>Central</u>	<u>Western</u>	<u>Eastern</u>	<u>Total</u>
Ph.D	6	0	2	1	9
MS	12	11	9	6	38
Undergrad.	20	27	23	15	85
Total	38	38	34	22	132

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As Table III shows, six of the nine Ph.D.'s are located at IDIAP's headquarters, as are 12 of the 38 researchers with M.S. degrees. Thus, 38 percent of those with graduate education (19 individuals) are in Panama City. IDIAP's records, however, show that six of these do not even work on IDIAP projects. Rather, they are assigned to MIDA, INA (el Instituto Nacional de Agricultura), or a regional office of IDIAP. In addition, two of the 16 with licenciaturas in agronomy, public administration, business administration, veterinary medicine, and economics are charged to IDIAP, but assigned to MIDA or the National Seed Committee. This slightly improves the real ratios of headquarters versus field allocation of personnel resources, but the headquarters payrolls are still unfairly burdened.

Almost 25 percent of IDIAP's staff is assigned to the headquarters in Panama City. An analysis of the 1985 POA (Annual Operating Plan) demonstrates that because of the concentration of higher salaried professionals and individuals charged to the headquarters payroll, but working elsewhere, total central office costs, including personnel, were higher than the total personnel costs of those conducting research.

A 1984 ISNAR/IFARD study (cited in Elliot et al.), compares the ratios of Ph.D.'s to B.S.'s, and the ratios of M.S.'s to B.S.'s for various countries in Latin America. Relevant information is presented in Table IV. This table illustrates that Panama has one of the highest ratios of researchers with advanced degrees to licenciaturas among its neighbors.

Table IV

Ratios of Ph.D.'s to B.S., and M.S. to B.S.

	<u>Ph.D./B.S.</u>	<u>M.S./B.S.</u>	<u>Ph.D.+M.S./B.S</u>
Panama (IDIAP)	.09	.36	.31
Costa Rica	.01	.16	.15
Dominican Republic	.05	.31	.26
Ecuador	.04	.45	.33
Honduras	.05	.13	.15

(source: Elliot et al, p.125-126)

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b. Constraints and Weaknesses

Clearly, IDIAP has successfully attracted young and well qualified researchers. However, IDIAP is suffering from growing pains. The young and relatively inexperienced researchers, 50 percent of whom are under 35 years old, and 56 percent of whom have less than five years experience, often are faced with inadequate research opportunities within IDIAP and limited official encouragement to continue their academic work through formal or informal contact with the Faculty of Agriculture. Also as a new organization junior researchers are frustrated by the small number of experienced researchers with whom they can work, the physical resources they have at their disposal, and a research organization that has not established clear priorities that would permit the best use of its researchers.

Most disappointing is that too many newly trained professionals are placed in administrative positions, with no ties to research projects. Trained economists, for example, are in abundance in the Panama City office but are lacking at the regional and sub-station levels. This lack of a capacity to perform agricultural economic studies at the field level will often prevent the adoption of technical advances that have been proven with field verified production techniques. Without farm level and market economic analyses the scientific effort cannot in good conscience be "sold" to the farming community. Thus, at the time when they have just completed their graduate training and are bringing new information to Panama, they are being hindered in their opportunities to apply their educations.

The large staff at IDIAP's headquarters, many of whom do little research, eats into the already scarce budget for operations and staff. More than one-third of the Institute's researchers with advanced degrees are located in Panama City; six out of the nine with Ph.D.'s are in Panama City. For the most part, these individuals are not engaged in sufficient research activities. IDIAP must study how these people currently are being utilized, and either provide for their transfer to the regional offices and experiment stations, or increase to 50 percent the time they devote to research. The fact that these people do little research and do not get out to the field impedes the formation of strong national research programs, and the formation of strong regional support teams.

Recommendations

- (1) Post-graduate training for Panamanian researchers should be planned, coordinated, and executed in harmony with priorities and objectives established for national commodity programs. This requires that IDIAP establish clear priorities as soon as possible. Now that a critical mass of researchers has been developed, future training must reflect the Institute's specific needs.
- (2) IDIAP should not hire more technical staff. It should seek to provide first rate training and research opportunities for its current staff.

Generally, the best choice of personnel for advanced training are people who have shown a serious dedication to field and laboratory work, and those who have demonstrated a capability for research. Demonstration of interest in the transfer of technology also is an important criterion, as these people should be sensitive to the principal clientele of IDIAP-- extension agents and agricultural producers.

- (3) IDIAP should carefully review its use of economists at IDIAP's headquarters, as well as increase the number receiving advanced training.

Economists should be trained in three primary areas. First, there is a need for micro-level production work where economists are incorporated directly into the multidisciplinary teams at the regional level. Studies on adoption, the economics of the technology (such as the opportunity cost of adoption), and institutional constraints toward adoption are needed. Second, economists are needed to work on marketing issues, in conjunction with the extension staff and the private sector. Increased information of domestic and international markets, transportation, seasonal price changes, and quality requirements are examples of the work these people should undertake. Third, an economist is needed to work on policy and macroeconomic issues. IDIAP planners must be aware of the economic ramifications of policy changes that will in turn affect the adoption of technologies. Quality economic analysis will provide IDIAP planners with the tools to argue policy issues and become leaders rather than followers in the agricultural sector.

- (4) IDIAP should continue to decentralize its operations. Careful programming of scientific and professional resources into field activities consonant with their training background and executive capabilities must be a basic tenet of overall resource planning.
- (5) IDIAP and the FAUP should continue to increase interinstitutional collaboration, not only at the research and training levels, but at the teaching level as well. IDIAP researchers should be encouraged to present their research results in seminars and publications, get involved in teaching or student advisory work, and generally develop their personal ties with the local academic community.

Scientists having administrative responsibilities should be encouraged to continue conducting research, even if at a reduced level. Perhaps once the facilities are completed at Tocumen, administrators at IDIAP's headquarters, as well as in the central office, will be able to conduct research at the facilities. This both enables them to keep their "hands-on" experience, as well as to maintain contact with their peers. The Team recommends that the national commodity program directors spend one-half their time conducting research.

2. In-Service Training

The study by Elliott et al., reports that the median number of short-courses attended per research worker at IDIAP was three. The mean duration of the courses was one month (p.127). Fully forty-five percent of the senior staff reported having attended at least three short-courses. Most of the courses have been offered by CIAT, CIMMYT and the IARCs (International Agricultural Research Centers). The Team saw considerable evidence that young researchers have benefitted from six month short courses at CIAT, CIMMYT, and CIP. These courses should be selected by IDIAP in accord with priorities, objectives, and on-going programs.

The Team saw some evidence that IARC trainees maintained test plots and materials that were as good as those maintained by staff with M.S. who had recently returned to Panama. This indicates that IARC trainees may have had more and better field training, and that they were able to bring materials for testing when they returned from the international centers. This should not be construed as a measure of the academic accomplishments of the two types of training; no such comparison is implied.

In general, IDIAP's personnel have had positive experiences with the short-courses. Many have returned after very little training, to run substations and manage experiments.

Recommendations

- (1) The evaluation team recommends that IDIAP strengthen its in-house, in-service, structured training program for scientists. One of the most important components of this program is the control that it will give IDIAP in determining the training priorities and the actual content of the short courses. The Team believes that IDIAP should develop the capability to know what short-term training is needed by its employees, and to know where to go to obtain the best provision of that training.

The Team would like to encourage IDIAP to use resources available within Panama as much as possible for these training programs.

The continuation of the ATD project should provide the technical assistance necessary to help IDIAP establish this capability.

An excellent model for developing an in-house, in-service training program is found in the training course created by ICTA in Guatemala. This course was designed to improve the farm level research capability of young agronomists for ICTA. A modified course was designed to train extension agents in the latest technologies available and in the supervision of farmer-managed validation trials.

- (2) In-service training must be planned and executed to backstop priority programs. Otherwise, this technique will be wasteful in time and money. The training must be organized objectively, using both local and international resources. Many qualified people can be identified locally and in other Latin American countries who speak Spanish and who are familiar with local conditions. These individuals should be utilized in the training programs.
- (3) The Evaluation Team strongly recommends that in-service training begin for the directors of IDIAP's sub-stations. The impression of the Team was that these substations are poorly managed-- from the research experiments down to the condition of the plumbing. The station managers should be given specific training in such functions as inventory control, basic mechanics, and office administration. Perhaps this training could be offered several months in a row, for a period of three to four days a month. Again, instructors and planners for this in-house training will be easy to identify in Panama.
- (4) IDIAP should continue to utilize the short-courses offered at the IARC's. The Team recommends that IDIAP carefully study the usefulness of the course before granting permission for a researcher to attend. A national organization, such as IDIAP, should avoid sending people for training just because it is offered with all expenses paid. The training courses and workshops at the IARCs on specific subjects such as yuca, seed production and handling, forage production, etc. are very helpful to well-selected persons. IDIAP should send staff to these kinds of training programs only if the training will be useful to the Institute.

3. Career Development

Professional opportunities and recognition are important incentives for young professionals. This is especially true when salaries are relatively low, working conditions are not ideal, and employment opportunities elsewhere are not available. In so far as possible, professional advancements and recognition, including administrative accomplishments, should be depoliticized.

Political intervention in technical organizations indicates that the government fails to recognize that a political solution to a technical problem is always invalid. Those governments which have yet to mature to a level where their political leaders separate political concerns from technical service and research organizations are not developing their countries at the most rapid rate. A system which recognizes professional accomplishment and rewards it in terms of stability, remuneration, and recognition by the community is needed if the country is to progress and develop its resources for the benefit of its people.

IDIAP offers one of the best opportunities in Panama for agricultural scientists to develop productive careers. Unfortunately, however, the Institute has not developed a way to reward scientists, in a professional sense, once their advanced training is completed and they have been at IDIAP for several years. The Institute needs to begin to provide for appropriate professional opportunities, such as attendance at professional meetings, and sabbatical absences at universities and international research centers.

H. Research and Technology Development Methodology

Introduction

The following discussion provides an introduction to research and technology methodology. The methodology is seen as a continuum that begins with fundamental research and ends with the dissemination of technology to agricultural producers. Diagram II-b is a visual representation of this methodology.

On the left side of the graph is fundamental, or basic, research. This generates new knowledge, many times carried out as an academic objective. While this basic knowledge contributes to mankind, it frequently is developed with no specific clientele in mind. IDIAP conducts very little fundamental research. Instead, it uses information from the world stock of knowledge, and seeks technologies and material from outside sources which can be used in applied research.

Applied research usually is conducted with a specific clientele in mind. It is directed for specific uses. Sometimes it is forgotten that applied research does not necessarily lead to the development of applicable

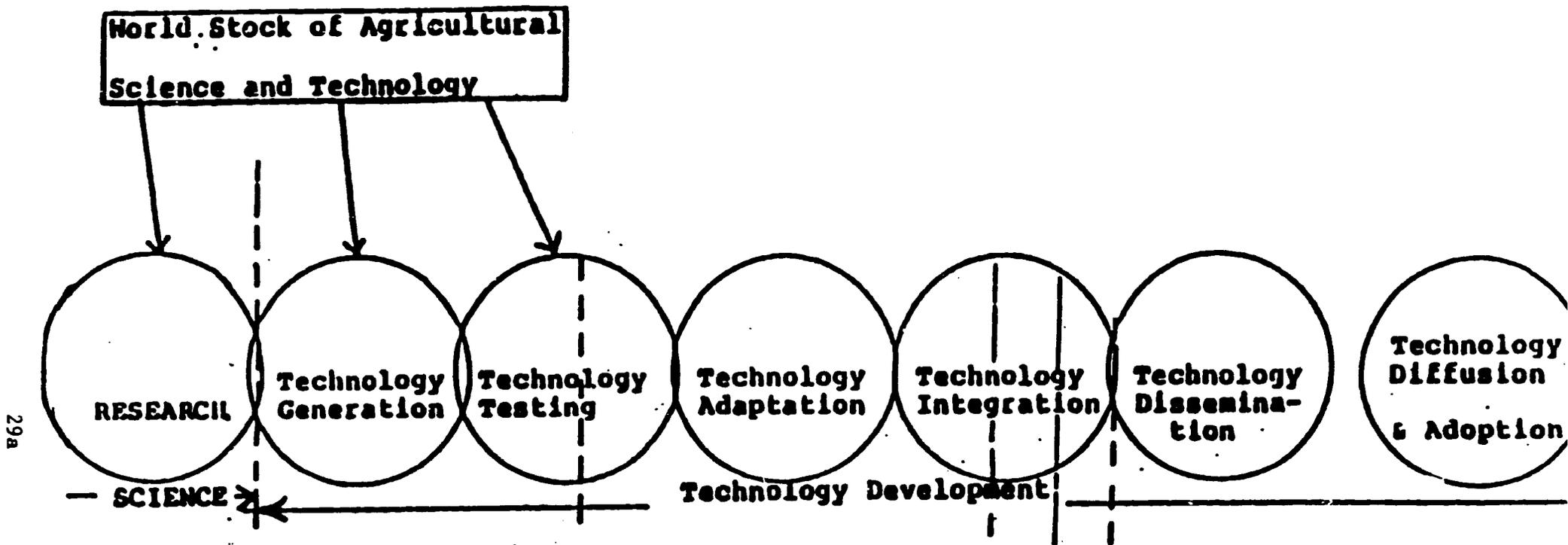


Diagram II-b The Technology Development and Transfer Continuum.

Source: INTERPAKS, University of Illinois as part of a collaborative USAID project.

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technology. The reason for the succeeding stages in technology innovation described below is to adapt the research findings to real conditions and to develop from them usable technology.

Alternative technologies are developed for testing because farmers' situations vary considerably, in part because of ecological conditions, in part because of the resources of the farmer, and in part because of variations in farmer management. Also market requirements must be examined in relation to new technologies. This testing is sometimes called adaptive research. Researchers and extension workers need to know which of the alternative technologies are the best (eg. which of two or three varieties of maize should be difused).

Technologies must be integrated into the biological system (the production system) of the farmer. For instance, can a variety that requires 10 additional days to maturity be integrated into the farmer's system ?

At the validation/dissemination stage the new technology probably has been tested with only a very limited number of farmers. The extension agents are not acquainted with the new variety. The new technology needs further validation with the participation of researchers, extension agents, and several farmers in the farming region.

This validating phase confirms or negates the appropriateness of the technology and gives more confidence to researchers, to extension agents and to farmers that the technology is or is not as good as evaluated during the preceding phases. This kind of validation allows researchers to move their findings more rapidly toward applicable technology for farmer use, without much danger of serious error. Validation can also and can remove one of the criticisms frequently leveled by extension agents that research has nothing to offer them. Validation can be an opportunity for the extension agent to learn how to handle the new technology. If the new technology has performed well, the validation trials initiate its dissemination.

While a good balance between commodity/discipline oriented research and on-farm adaptive research could consist of varying amounts of each, and will vary depending on many factors such as the kinds of problems confronting agricultural production, the 70 percent on-farm work reported by IDIAP is probably a good balance and the Team recommends that this percentage be continued unless there are specific problems that show that a change is needed.

On-farm validation trials may be of two general kinds. One is the researcher-managed trial to test a new technology under farmer's conditions. A second kind of validation is a farmer-managed trial. What happens to the new technology when the farmer manages it? What are the yields, and variation in yields under farmers' conditions when the technology is subjected to all of the varied and less than ideal treatments that farmers will give it? Have farmers had adequate opportunity to work with the new technology to the point that its acceptance to them is reasonably certain?

2. Current Situation

a. Accomplishments

IDIAP had completed 1655 field trials by March of this year, which was about 400 more trials than planned under the ADT project (FY86, 1st semester report, AID Office). Also reported were 72 "technology" field days, a dozen more than planned.

The Team believes that IDIAP has made, and is making, major contributions to agricultural production. Private producers told the Team that IDIAP's technology increased onion production by 50 percent in 1985 and that the on-farm work in Caisan contributed to significantly increased corn and bean production. The commercial varieties of tomatoes used in Panama were developed by IDIAP. These and other examples show that technology has been developed by IDIAP and more importantly successfully adopted by farmers.

IDIAP also has done considerable on-farm research. The Team found several instances of effective work, both applied research on the experimental stations and adaptive research at the field level, by young scientists who appear highly capable and motivated.

The decentralized system allows IDIAP to give attention to the different phases of technological innovation to a much greater extent than would a centralized system or one that limits its work to experiment stations. The Evaluation Team feels this decentralization is positive and should be strengthened.

The Team also found evidence of innovative research arrangements. Certainly, the onion research program with the cooperative in Boquete is a model that warrants study for use in other parts of the country. Again, additional possibilities for consolidating research (and extension) efforts and for including the public and private sectors in the pursuit of solutions for problems that they have in common should be supported.

b. Constraints and Weaknesses

Despite surpassing the number of planned field trials and field days, the reports indicate only 161 validation trials were completed of a planned 240. It is logical when starting on-farm research to first conduct researcher managed field trials and follow them with validation trials as promising technologies are identified, it is not surprising that there are more field experimental trials than validation trials. However only a relatively few validation trials were programmed and even this low goal was not met.

Technology innovation has a sequence, as already explained. The Team did not find a sequential methodology, phased research strategy being followed in IDIAP. In addition, as mentioned several times in this study, IDIAP lacks strong national commodity and discipline teams. In large part because of this, its area-focused teams also have remained weak.

c. Modify Area Focus of Research

The Evaluation Team suggests a modification of the concept of area focused research as applied to the original project. The original project delineated specific geographic areas in which the project was to function, with no allowance made for changing these areas as the needs of the project changed. For example the Boquete area was not mentioned in the project; therefore the onion project received only limited financial support.

The Team believes that an area focused approach is important. However there should be flexibility to select new areas according to priorities. IDIAP does not have enough commodity specialists to assign one of them to each specific geographic farming area. Nor should IDIAP only assign generalists, without adequate supervision, to these teams. Considering the limited resources available good planning will require pragmatic technological and economic analysis and some painful priority setting.

d. National Commodity Teams

The Team feels that strong commodity teams, with national responsibilities, should be organized to supervise the technical activities of the farming area teams. The purpose of these national teams would be (a) to serve as the linkages with sources of technologies;)b) to be the focus of the development of technology that supports these teams; and (3) to supervise and support the farming area teams.

The number of national commodity teams to be organized should depend upon the priorities determined. A commodity team is not necessarily required for each crop. In some cases a team can be formed for a group of related crops. Members of these teams should also spend part of their time supporting transfer activities as needed, especially when members of the farming area teams need help in responding to problems of the producer clientele.

Members of the national commodity teams, in general, should not be located at the central offices of IDIAP, but in strategic places within the regions, such as at an experimental station.

e. Farming Area Teams

Some mechanism, or organizational structure, is needed to increase the coverage of IDIAP's national programs. National commodity teams alone cannot cover enough area.

The Evaluation Team suggests that farming area teams be organized to meet the demands (needs) of the selected farming areas. The Farming Area Team would work within one of the selected geographic farming areas mentioned above. The team could consist of three to five or more members. An individual researcher, especially one with limited experience, tends to have little visibility within an area, does not have the benefit of close association with colleagues, and is more difficult to supervise. Also an individual, especially one with limited experience, cannot usually make much of an impact if he must work on complex and/or multiple problems alone.

These area teams can be used to bring together research and extension personnel. The teams are excellent vehicles to train young agronomists for research, as well for extension.

If the area team approach is combined with strong commodity and discipline support then the "distance" from technology generation to technology adoption is reduced to a minimum. This can help to prevent gaps in the technology innovation continuum.

Diagram II-c illustrates the structure of the relationships between national commodity programs and farming area teams.

Recommendations

- (1) Revitalize national commodity and discipline teams.
- (2) Organize regional farm level work by farming areas.
- (3) Establish linkages with extension and find a means for extension workers to participate in testing of technologies through supervised, farmer-managed validation trials. Team leadership would be as agreed by IDIAP and Extension.
- (4) In addition to forming linkages with extension, also develop linkages with farmer groups, the BDA, and private agribusinesses (both farm input suppliers and output consumers) that would collaborate in on-farm research and especially in farmer managed validation trials.

3. Technology Transfer Linkages

This report emphasizes the importance that technological innovation be structured as a continuous process (See Diagram II-d). However, linkages with organizations and groups should be established to ensure that the process of technology development and transfer is a continuous one and to take advantage of several "actors" active in the dissemination of technology. Frequently the research organization, through its own actions or lack of action, becomes an island. Research results that are not used have no value to farmers. True, some research results have a latent value that will not be realized until

Illustrative structure showing relationship of Commodity Programs & Farming Area Teams

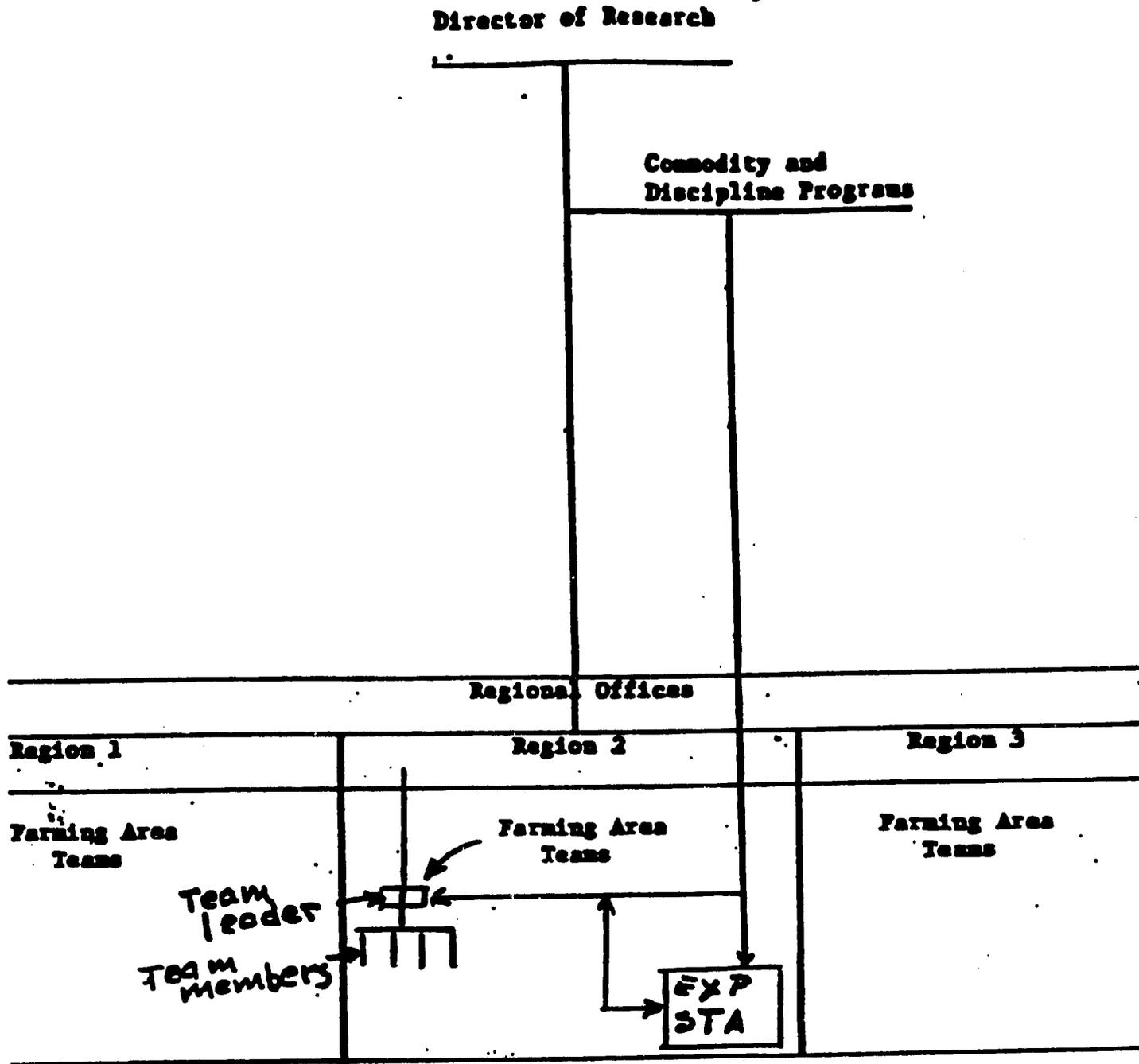
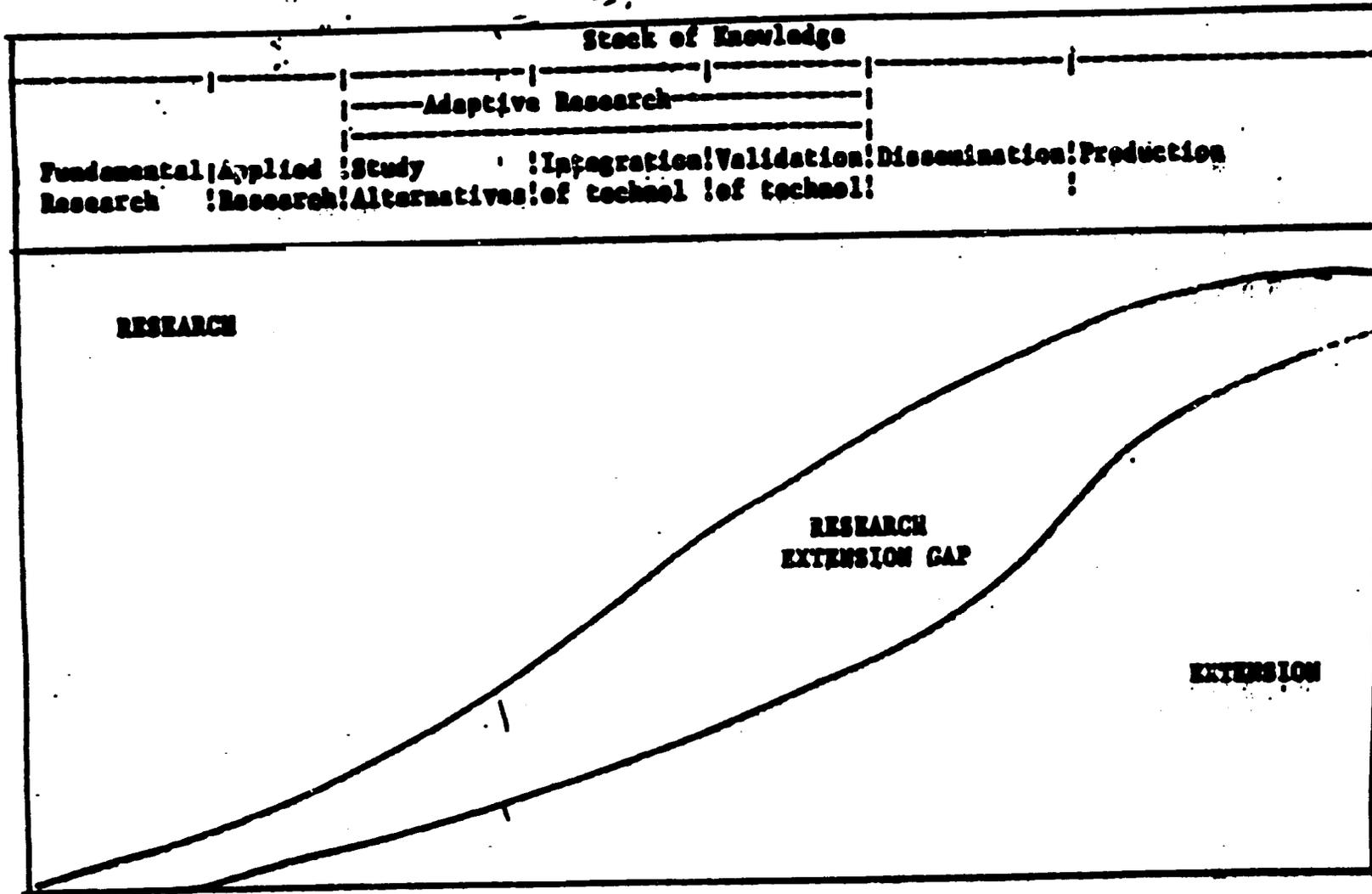


Diagram II-c

TECHNOLOGICAL INNOVATION



33b

Diagram II-d

years later. However, while this latent value is important, it cannot justify failure to address the immediate productivity problems of today. Adaptive research must lead to technologies that are applied in the field, and the quicker the better. Short descriptions of the most important contacts for technology transfer follow:

Linkages with the Extension Service

IDIAP's major link with technology transfer should be with the Extension Service. It is only logical to structure the organizations responsible for research and transfer in a manner to facilitate the AIDET process. We believe that Panama's AIDET system and the relationships among the organizations in the system must be such improved. Even if the technology development and transfer functions were placed in a single organization, linkages must be established between technology development and technology transfer to ensure that the process is developed as a mutually reinforcing continuum. Linkages are essential because there usually is an area between the generation of technology and its transfer to farmers that is not covered by either group.

This gap must be covered and should be covered by both groups. This can be done without duplication if work plans are developed that guide all activities and clearly designate responsibility between the two groups. Farmer-managed trials may be supervised by either Extension or Research; however, it is obviously better if both groups participate

This kind of linkage must be sanctioned at the highest levels, but to be effective, the action, the actual linkage, must be realized at the field level. Lack of sufficient attention to the objective of field-level collaboration is frequently the reason why decisions and agreements at the higher levels are not implemented. Liason personnel and subject matter specialists, often considered as reasonable linkages between research and extension, are frequently little more than a layer of insulation between the two groups. They tend to reduce the contact between researchers and extension agents rather than foster close relationships.

Researchers frequently consider extension agents inferior and this attitude must be changed. In fact, the best research ideas often come from the extension personnel who work most closely with the farmer. On the other hand, research groups are a key resource that should be utilized to improve the technical competency of extension workers. Research should take as a prime responsibility the improvement and strengthening of extension. This is required because research needs extension to create an increased demand for technology. Without a demand for technology, there is little justification to support the research. Extension can best meet the needs of the researcher and the farmer by developing its technical capacity to participate in the design, implementation, and evaluation of on-farm adaptive research programs. Further, extension must develop its technical capacity to disseminate validated technology through a variety of media and channels depending on the farmer audience or clientele group.

Key to this whole process is ensuring that there are adequate linkages between Research and Extension. Planning together, training together, strong support at the field level, especially technical backstopping, and joint testing and validation of technologies are activities which contribute to a strong and effective research/extension linkage.

Linkages with Farmers.

While a research organization may not have a mandate for disseminating technology because of the presence of an Extension Service, this is no excuse to say, "No, we don't collaborate with farmers. That is the job of Extension." The testing and validation of technologies at the farm level is basic to the process of technological innovation and the collaboration of farmers is necessary, particularly to ensure that the technology is validated over a much wider range of conditions. The systematic participation of many farmers in a program of farmer-managed trials, supervised by Research and/or Extension, is essential if reliable data are to be obtained on the validity of the technology at the farm level. This kind of activity cannot be carried out without linking with farmers. These linkages may be formed with individual farmers or they may be developed through farmer groups and cooperatives.

Farmer groups and organizations should always be considered as possible transfer links, either directly or in collaboration with Extension. Most countries have organizations such as Banana Grower Cooperatives, Livestock Producer Associations, Coffee Federations, etc.

Linkages with Industry

Are fertilizer distributors supplying the needed formulas? If not, could blenders be convinced to make changes? Are inputs such as herbicides being packaged in appropriate sizes? Input distributors and salesman who offer advice to farmers and retailers are performing as transfer agents. Can researchers and extension personnel increase the ability of these transfer agents to give appropriate advice?

With the exception of a few cases of linkage between IDIAP and the MIT project in Chiriqui, Parita, and Tres Quebradas, there is a major gap between IDIAP's technology development function and MIDA's technology transfer function. Various factors including organizational structure, politicization, and negative attitudes hinder good collaboration. For example, the two organizations, though of the same sector, do not use the same regions. IDIAP has three regions with sub-regions, while MIDA has eight regions with area-based extension offices (Agencies).

Linkages with the Private Sector

IDIAP has established some productive linkages with private farmers through on-farm research in several areas. In some cases (crops and/or regions), as much as 70 percent of the total research effort is on-farm.

This is a major transfer link. However, full advantage has not been taken of this transfer link because only a relatively few farmer-managed validation trials have been done and few, if any, extension workers have been effectively involved in the process. This link is an important one, and its utilization should be expanded.

Three examples of linkages with private producers are: (1) the collaborative work on onions with a Boquete cooperative, (2) support of the banana producers in developing banana research capacity in IDIAP, and (3) support of work on yuca with a cooperative in Ocu. Arrangement like these are innovative and have the effect of shortening the distance between technology generation and its use in production.

There is some collaboration with the FAUP at David in rice and pastures. Also work is being initiated with the University (e.g., biotechnology) and with Sanidad Animal (cattle reproduction). These latter linkages are not specifically transfer links to producers and, in fact, may dilute the effort to focus directly upon production problems.

4. Recommendations

- a. Continue to strengthen the linkages with farmers through more more farmer-managed validation trials.
- b. Do everything possible to improve linkages with extension. Two strategies would seem to be highly indicated: (1) training of extension agents through in-service training courses; and (2) that both IDIAP researchers and MIDA extension agents collaborate in the development and supervision of validation trials.
- c. Increase linkages with private producer groups such as cooperatives for the purpose of jointly planning, implementing, and evaluating programs to develop, adapt and validate technologies for production systems.

The Public Sector The Faculty of Agronomy

The Faculty of Agronomy, University of Panama, is an important link in the chain of agricultural technology development and transfer. According to Dean Alfredo Bernal, 45 of the faculty's 90 staff both full and part-time people are engaged in research at Tocumen and other locations around the country.

2. Public Sector

Technology transfer: As stated many times through this report, better links must be developed between IDIAP and the unit(s) within MIDA that are responsible for technology transfer.

BDA (Banco de Desarrollo Agropecuario) and BNP (Banco de Panama). These two public sector banks are responsible for almost all production credit to the agricultural sector. In addition, they are the recipients of international assistance for improving and increasing the credit system, and for actual farm-level work.

Since credit decisions are based on risk analysis that includes the viability of a chosen technology package it is critical to formally include BDA in the validation stage. With close collaboration the BDA can become an important promoter of adoption of newly validated technologies. Good economic work by IDIAP at this point will also speed acceptance by BDA and therefore the availability of credit for the given technology.

6. **Natural resources and conservation:** IDIAP has some experience in the field of conservation. IDIAP should begin to work more closely with the newly forming natural resources institute (INERARE). Water and land conservation practices should be incorporated directly into the developments of agricultural technologies.

A country needs to regulate the use of chemicals, and ensure quality in agricultural inputs in order to protect the environment and prevent misrepresentation of products in the market.

It is the opinion of the Team that IDIAP should actively participate with the regulatory agencies when it has information that would help arrive at logical decisions for the formulation of regulations.

However, IDIAP should not be responsible for the policing action necessary for enforcement of the regulations. The Institute should remain free to state its opinion based on its knowledge of science and technology and not influenced by the political aspects of the regulations, which would occur if IDIAP was assigned an enforcement function.

III. Agriculture Technology Transfer (ATT) Project Evaluation

1. Project Setting

The project paper for the ATT project stated in 1982, that the Government of Panama's policies are designed:

"to accelerate agricultural growth in order to make the fullest possible use of the nation's natural resources, while conserving the resource base, to enhance the growth of gross internal product, to increase the supply of food, whether for domestic consumption or for export, to provide employment for an expanding labor force, to provide raw materials for industries based on agricultural inputs, to improve external trade accounts through substitution of imports, and to improve opportunities for the population of rural areas."

The GOP' agricultural policies remain generally the same today except that less emphasis is placed on import substitution. There is now growing awareness that Panama needs to prioritize the commodity program areas in which the GOP will assist the agricultural sector, particularly as regards the specific supports or incentives that will be provided for developing efficient agricultural production and marketing capability.

Agricultural extension services began to be developed in Panama as early as 1928, when the first major effort was made to train "agricultural agents." In 1948, the Agricultural Development Service (ADS) was created by the Ministry of Agriculture, with the purpose of providing technical assistance to farmers through demonstration activities and visits to farms. The ADS operated out of the Instituto Nacional Agropecuario (INA) until the end of 1952, when, by law, it was placed under the Ministry of Agriculture. Extension offices were organized at the national, regional, and local levels. The ADS was disbanded in 1971-72, as it did not fit into the strategy for the rural sector proposed by the government at that time. The Ministerio de Desarrollo Agropecuario (MIDA), which was founded in early 1973, has been carrying out some of the functions of an extension service through its regional offices. However, from 1973 until recently, MIDA had focused most of its attention and resources on the asentamientos (government-supported agrarian settlements), state owned agribusinesses and officially controlled farming and production cooperatives - to the neglect of private producers. About two years ago, MIDA's orientation began to change, with an increased emphasis on providing technology transfer services to small- to medium-sized farms.

Concern about low crop and livestock productivity in the agricultural sector led the GOP to create the Instituto de Investigacion Agropecuaria (IDIAP) in 1975. By the end of 1979, with the assistance of the USAID/Panama supported Agricultural Technology Development (ATD) project, IDIAP had begun to develop an area-oriented, on-farm adaptive research approach aimed at developing appropriate technologies for small and medium producers. As part of this approach, IDIAP also developed a limited capability to disseminate validated technologies to farmers in the areas where the on-farm adaptive research program was being conducted.

At the time that the project paper for the ATT project was written, various GOP agencies (MIDA, IDIAP, BDA, etc.) were involved in the transfer of technology to farmers. However, as stated in the paper: "Despite these efforts, ...there is little linkage or coordination among the extension activities of IDIAP, BDA, and MIDA's Regional Directorates, each of which provides agricultural services independent of the other, according to its own perception of farmer needs and its own institutional requirements." It was within the context of this environment that the ATT project was designed as a pilot effort to link IDIAP's on-farm adaptive research and technical training capabilities with the potential extension capabilities represented by the field-level agencies of the MIDA Regional Directorates (MIDA/RDs).

In February 1984, based on Law 19 of October 5, 1982, the GOP deleted from IDIAP's charter the responsibility for technology transfer. At the same time, the Servicio Nacional de Extension Agropecuaria (SENEAGRO) was established in MIDA as the Direccion Nacional de Extension Agropecuaria. SENEAGRO was intended at the national level to be a policy advisory unit to formulate extension policy, train MIDA staff, and develop training materials. Direct extension activities were to be provided by MIDA staff assigned to regional and local (Agency) offices.

Pursuant to Law 2 of March 20, 1986, MIDA reorganized the Direccion Nacional de Extension Agropecuaria and renamed SENEAGRO the Servicio Nacional de Capacitacion, Transferencia de Tecnologia y Asistencia Tecnica. As part of this process, MIDA is currently reviewing a proposal to change the name of the Direccion Nacional de Extension Agropecuaria to Direccion Nacional de Capacitacion y Transferencia de Tecnologia Agropecuaria (DINCAPTA). It is impossible to know what effect this will have on project implementation.

2. Project Design

The Agricultural Technology Transfer (ATT) project was designed as a pilot project that, if successful, might be expanded in subsequent phases to create a national agricultural technology transfer system aimed at providing small and medium farm operators with a continuous flow of adapted agricultural technologies. These technologies, as conceived in the project design, were to be provided by the Instituto de Investigacion Agropecuaria (IDIAP). The ATT project is being developed in the Ministerio de Desarrollo Agropecuario (MIDA), with coordination at the national level being provided by the Servicio Nacional de Extension Agropecuaria (SENEAGRO), and implementation at the regional level being provided by the MIDA Regional Directorates (MIDA/RDs). Long-term technical assistance to the project is being provided by Chemonics International (two expatriate resident consultants).

As conceived in the project paper, USAID/Panama would assist the Government of Panama (GOP) in establishing an operational agricultural technology transfer system

"aimed at providing small and medium farm operators in Chiriqui province with a continuous flow of adapted agricultural technologies and improved practices." Later phases will expand the geographic coverage and create the necessary institutional infrastructure for a national system."

Under the project design, the project was to be coordinated by the MIDA, with project activities being implemented by MIDA extension personnel from MIDA Region 1 (Chiriqui province). The project design also provided for the IDIAP to be the source of the adapted agricultural technologies that the project would transfer to farmers.

The planned obligation under the project's first phase was not to exceed US\$6,000,000 in loan funds and US\$1,500,000 in grant funds over a seven year period from the date of the project's authorization (September 22, 1982). Additionally, the project was to be supported by US\$6,340,000 in counterpart funds provided by the GOP. Both the the loan and grant components of the planned obligation were to be fully funded in FY 1982, with the project being fully disbursed within 81 months from the date the conditions precedent to first disbursement had been satisfied.

The original project design provided for project funds to be utilized to finance construction/remodeling of extension agency facilities, training, short-term technical assistance, purchase of equipment and materials, and institutional coordination of public- and private sector organizations. Table 1 provides a summary, as reported in the project paper, of the estimated costs for implementing the MIT project based upon a seven-year project. A long-term resident consultant component was added to the project in 1984. Tables V-A 1 and 2 provide a summary of authorized funding and of expenditures to date for the project components.

Table A-1. Summary Project Costs (US \$000)

<u>ELEMENTS</u>	<u>USAID</u>		<u>GOP</u>	<u>TOTAL</u>
	<u>DL</u>	<u>DG</u>		
Technical Assistance (45 p/m)	280	85	-	365
Training (176 persons/2,498 p/m)	2,377	1,415	-	3,792
Equipment/Materials (incl. vehicles)	2,168	-	667	2,835
Infrastructure (11 buildings)	1,175	-	26	1,201
All Project Related Salaries	-	-	5,647	5,647
Project Total	6,000	1,500	6,340	13,840

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In terms of targets or objectives, the project paper called for the "operational agricultural technology transfer system" to be capable of delivering new technologies to "80% of small/medium producers on a yearly basis by 1989 with an adoption rate of 60%."

It is with the benefit of hindsight that one might now judge that these targets (objectives) were, to say the least, ambitious. Today, just as originally stated in the project paper,

"Panamanian agriculture remains underdeveloped, with some of the lowest levels of technology...in Central America. This condition reflects, in large measure, the failure of the institutions within the sector to develop and provide agricultural producers with a systematic flow of relevant information and technical support on new technologies, farm practices, and crop and marketing information which can significantly improve yields and raise farm income."

Nearly four years have passed since the project was authorized. Since its inception the ATT project has been fraught with political and administrative problems that have impeded the flow of resources and action essential for project implementation. As the project is only now completing its first year in the field, systematic data are not yet available on its impact on adoption of technology or increments in farm-level productivity and income. Yet the project has made some progress at each of its three project locations (Chiriqui Province; Parita, Herrera; and Tres Quebradas, Los Santos).

The current evaluation attempts to provide perspective on the ATT project. This perspective includes consideration of what the project set out to accomplish, how the project is currently being implemented, the problems or constraints which continue to impede project implementation, and recommendations for action to strengthen the project's ability to transfer agricultural technology to Panamanian farmers.

3. Institutional Setting

The ATT project is being coordinated within MIDA at three administrative levels (national, regional, and agency). At the national level, the project's National Supervisor in SENEAGRO is responsible for coordination of the project in three regions: Chiriqui (Region 1), Herrera (Region 3), and Los Santos (Region 8). The National Supervisor provides policy guidance for the project, with actual project implementation being carried out at the regional and Agency levels. At the regional level, the project is administered by the MIDA Regional Directors. In Chiriqui, the project is being implemented in all ten of the region's Agencies (as opposed to only three as planned in the Project Paper), with five of these being classified as Type A Agencies and given higher priority; the remaining five Type B Agencies are being given lower priority. In Herrera and Los Santos, only one Agency per province is currently participating in the project (Parita and Tres Quebradas). Neither was part of the original project design.

At the Agency level, the project is administered by the Agency Chief. In the case of Parita (Herrera) and Tres Quebradas (Los Santos), the Agency Chief also has the role of Regional Project Coordinator. The Agency Chief's authority, however, is limited, as this person operates under the authority of the MIDA/RD. In Chiriqui, the Regional Project Coordinator (RPC) is responsible for working with each of the ten Agency Chiefs to carry out implementation of the project. While the RPC has limited authority (i.e., checks against the project's bank account cannot be issued without his director's signature), this person is nevertheless under the authority of the MIDA Regional Director who retains the authority to direct Agency Chiefs as regards other MIDA functions for which the Agencies are responsible.

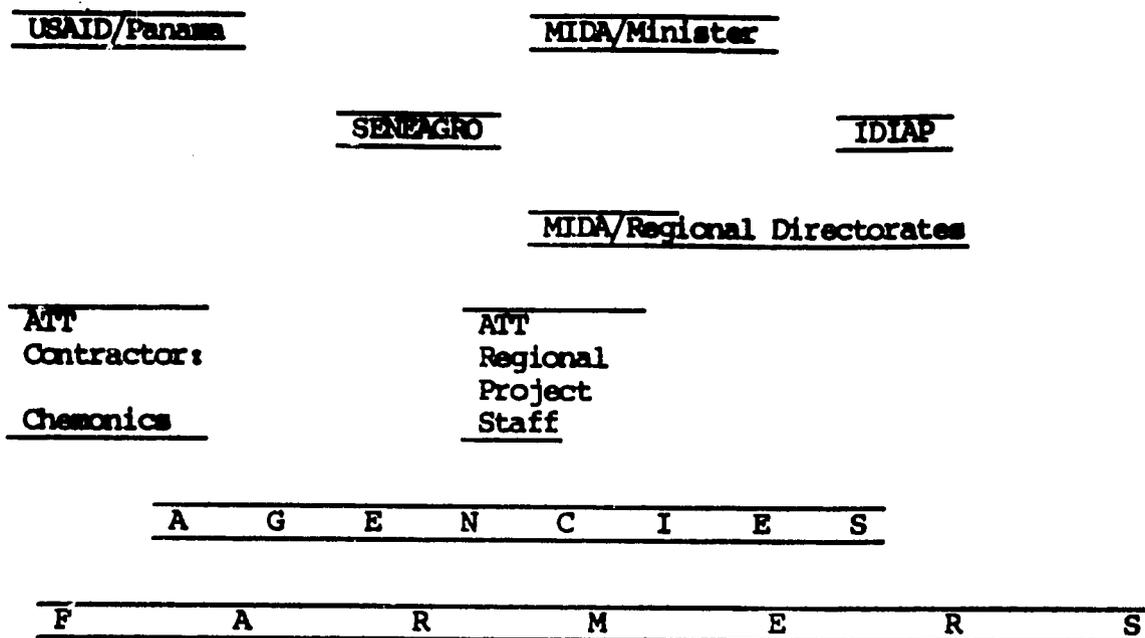
USAID/Panama has worked closely with the MIT project to achieve a more adequate degree of decentralization of authority for project implementation. Nevertheless, as is suggested by the project's three-tiered administrative structure, the project continues to be the victim of a tug of war between those who are seeking greater centralization and control over project resources, and those seeking greater decentralization. This problem is further aggravated by a concept of bifurcated authority that is built into the organizational structure of MIDA. Specifically, SENEAGRO at the national level is designated under law as having "normative" authority over how technology transfer (or extension) is to be implemented in Panama. On the other hand, MIDA's RDs are designated as having the "executive" authority to implement MIDA's various functions, including extension, within the regions. The tension and conflict built into the system by the existence of these bifurcated lines of authority makes life difficult for Agency Chiefs and administrative personnel who must deal with both in order to get the resources to the field.

Discussions held by the Evaluation Team with MIDA officials at the national, regional, and Agency levels indicate that there is an ongoing struggle between the Regional Directorates and the various National Directorates. At issue is the amount of power the National Directorates are to be allowed to have to exercise "normative" control over how technology transfer is implemented in the various regions. As previously noted, the Direccion Nacional de Extension Agropecuaria was recently restructured. This directorate's former crops and livestock divisions have been reestablished as separate National Directorates. The benefits of these changes are still being debated within MIDA and it is likely that further changes will occur in the years to come. In the meantime the project, and extension in general, will suffer the consequences of this convoluted organizational structure.

4. Project Organization

This figure provides a schematic overview of the project's institutional participants:

Figure V-A-2.



Seven points relating to the original ATT project design should be noted:

- + The ATT project's original design provided for MIDA's Minister to designate a National Supervisor (NS) to coordinate the project at the national level. Whether any individual within MIDA was designated as the NS at the project's outset is not clear. With the creation of SENEAGRO, the Director of the Direccion Nacional de Extension Agropecuaria became the project's National Supervisor but did not have any executive authority for project implementation at the regional and Agency levels.
- + The project agreement provided for the project to be implemented under the MIDA Regional Director, with the authority for daily project implementation delegated to the Project Coordinator. While the Project Coordinator has attempted to carry out his role, he has been severely impeded by having little or no authority to allocate project resources in an effective and timely manner.

- + The project agreement required that a special financial management system be established for the project. The Contraloria General designed a system acceptable to the ATT project and USAID/Panama. However, this system was never implemented due to the lack of an authorization letter from the Contraloria to MIDA. Thus, the project continues to be subject to MIDA's official financial management system.
- + Another ATT project design element that was never implemented related to the role of IDIAP. Subsequent to implementing the project, Law 19 removed the technology transfer function and the Technical Transfer Directorate from IDIAP, and created within MIDA the Servicio Nacional de Extension Agropecuaria (SENEAGRO). SENEAGRO could have played an active role in developing technical training and liaison with IDIAP.
- + The project agreement called for a project liaison person to be appointed within IDIAP. This was never done. It was reported that the Director of IDIAP felt that he did not have adequate staff to assign someone to this role.
- + While IDIAP did present to MIDA a proposal for providing training and technical services to the project's extension personnel, MIDA never replied to this proposal and current USAID/Panama project officers could provide no explanation as to why the USAID/Panama officials managing the ATD and ATT projects at that time failed to resolved this matter.
- + The project design called for 24 subject matter specialists to be assigned to the project from MIDA. At present, in Chiriqui there are 5 such specialists and of these only 2 have formal training. 29 individuals are in overseas long term training program and they return the severity of this shortage of qualified personnel will be alleviated.

5. MIDA Project Staff Resources

The overall staff of the ATT project in Chiriqui numbers 144 people. Twenty-five people are assigned to various administrative offices in Chiriqui, with the balance working at the Agency level. At the regional level, there are 5 technical specialists; 2 have degrees at the masters level and three have a number of years of experience. The following personnel were reported to be assigned to the project in Chiriqui:

3	M.Sc.
29	B.Sc.
112	Bachiller
<u>144</u>	Total

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Staff Selection

The Project Coordinator has little input to and authority as regards decisions made by the MIDA/RD on who is assigned to the project. The Project Coordinator may be consulted on transfers and at times has initiated requests that certain staff members be transferred. In some cases the MIDA/RD and Project Coordinator were not consulted before personnel changes are made in the project. Personnel changes can be dictated at the national level. While the average time of a person in a given position in MIDA is reported to range two to six years, the project has lost some people shortly after they had completed training programs to develop knowledge and skills essential for effective project implementation. This is a serious problem given the urgency for developing trained personnel to support the project.

The informal personnel system to which project staff are subject does not always support performance. Salaries appear somewhat capricious, there is no evaluation system regarding performance, and little incentive to perform well on the job. Modifying such systems to support the goals of the project needs to be a primary goal of MIDA management.

6. Training and Career Development of Technology Transfer Personnel

Long-term Training

Four Panamanians have completed long-term training and 29 are receiving training. The project originally planned only for M.S. training. Subsequent evaluation of training needs, as determined by a detailed training plan covering the 1982-1989 period, indicated that the program should be restructured to better meet the project's real training needs through a mix of M.S., BSc., and associate degrees.

As increased numbers of Panamanians are away for training, the project will face a constraint in terms of not having experienced personnel to support ongoing project activities. USAID/Panama and the GOP should take this constraint into account, to ensure that the project is not geographically expanded beyond its manpower capability and that adequate personnel are programmed to provide for replacement of project staff who are away for training.

Short-term Training

The ATT project has been conducting in-service training programs to develop the technical capability of project personnel. Agency personnel have also been trained to develop annual operating plans (work plans). In 1986 for the first time, the Agencies in Chiriqui developed individual Agency work plans. Also, selected project staff received instruction in the use of audio-visual aids. The extension agents have been receiving regular training

from the project and to a limited degree from the FAUP in David and IDIAP. This training process will take years before the corps of agents can be considered fully qualified and even then regular up-grading and skill sharpening training will be necessary to attain a level of professional skill that will provide quality technology transfer to the farmers and the important organizational pride that is necessary to attract and keep high quality personnel in the extension service.

Project provided training should be considered a temporary activity until MIDA develops and institutionalizes a career training program. At this time, the FAUP and the INA appear to be the appropriate educational institutions to handle the bulk of the technological training with field support from IDIAP. Training in administrative skills is once again the direct responsibility of MIDA and can be implemented without additional funding commitments since salaried staff can design and deliver the training.

7. Supplies and Equipment (including vehicles)

The project has reported problems concerning maintaining access to and control over the use of project vehicles. Excesses in indiscriminate use of project jeeps have been curtailed. There is also a question of whether the project has adequate draw down control on supplies purchased to support the project but to which MIDA personnel not working on the project have access. This area needs to be closely monitored by USAID/Panama and the GOP to ensure that the limited resources available get to the project in the field on time and in the necessary quantities.

The project is at least two years behind schedule. Vehicles were obtained a little over a year ago. In 1986, GOP counterpart funds for operating expenses did not become available until early July. However, in early spring of 1986, USAID/Panama reprogrammed US\$20,000 from project funds for a gasoline and vehicle maintenance "bridge fund". Even then the cumbersome financial system and slow processing of this new money prevented the project from receiving the full benefit of this emergency action.

The field demonstration program requires timely purchase and distribution of program support materials (e.g., fertilizers) to participating Agencies. In the AIT project, many steps and approvals are involved purchasing such materials. USAID/Panama and the Project Coordinator have tried to expedite purchases by establishing a project-level financial management unit. While this unit can effectively handle many of the project's finances (e.g., budgeting and accounting), neither it nor the Project Coordinator has any authority to approve purchases, only the Regional Directorates purchasing department can do so. Therefore the project administration must prepare requests with sufficient time to allow for the routine purchase of critical inputs. The project should not develop short-cuts to avoid GOP purchasing regulations, rather MIDA must address and resolve this simple procedural issue internally.

B. Budgeting and Financial Management Process

1. The Budget Process

The ATT project has established a budgeting process initiated at the Agency and technical department levels within the project. Each of the project's technical departments and Agencies in Chiriqui is responsible for preparing an Annual Operating Plan (POA) (discussed below) and an annual budget. Line items included in the ATT project budget are equipment operation and maintenance (gas, spare parts, etc.), field supplies for establishing on-farm trials (seed, fertilizer, chemicals, etc.), and office supplies. When a new Agency is to be constructed during the following year, the budget for that Agency includes line items for a two-way radio and office and lodging furniture. The project does not budget for Agency-level audio-visual equipment, as such equipment is only located at the ATT project office in David. The overall ATT project budget now also includes US\$50,000 which USAID/Panama has approved for use in special projects (discussed in section G).

The Agencies prepare their budgets for the following year during July-September based on the proposed POA. The budget is to be submitted to the ATT project office not later than September 30. The budgets are reviewed by the ATT project coordination team to identify any needed adjustments. Based on the adjusted POA/Budget for each Agency, a combined POA/Budget for Chiriqui is prepared. The POA/Budget should be ready for submission to the MIDA/RD not later than October 15. Once approved by the MIDA/RD, the POA/Budget is forwarded to SENEAGRO in Santiago, where it is combined with the budgets for the other two project sites (Parita and Tres Quebradas). The combined ATT project POA/Budget should be submitted to USAID/Panama by November 1, where it is reviewed by the appropriate USAID/Panama staff. Once the POA/Budget has been approved, USAID/Panama sends a Project Implementation Letter (PIL) to the ATT project to apprise that the POA/Budget has been approved.

Ideally, this budgeting process should be completed by January 1. But the 1986 budget on which the ATT project began working in 1985, was not submitted to USAID/Panama until approximately January 15, and the PIL was not issued until March. Limited project activities during early 1986 were partially supported by unspent 1985 funds carried over into 1986.

The preceding description of the budgeting process relates to the steps involved in securing USAID/Panama review and approval of how grant and/or loan funds will be used by the ATT project. It is not the review and approval process involved in allocating GOP counterpart funds to the project. These counterpart funds consist of the salaries paid MIDA personnel assigned to the project and the funds provided from loan and/or internally-generated funds for various budgeted line items (e.g., operation and maintenance of vehicles). Although there have been no delays in the provision of counterpart funds for payment of salaries, project implementation was significantly impeded during 1985 and the first half of 1986, because the GOP did not provide any of the counterpart funds that had upon agreed upon for operating expenses (including US\$60,000 per year for vehicle operation and maintenance).

The GOP allocated a portion of the project operating funds in early July, 1986, specifically, US\$40,200 (59% of programmed operating funds for the first half of the year and 35% of total programmed operating funds for the year). During the first half of 1986, mobility of project staff could only be achieved because of the US\$20,000 loan approved by USAID/Panama and funds made available by the MIDA R/D during the first 3 months of the year. Difficulties in project implementation arising from nonavailability and/or delay in receipt of counterpart funds stem from severe constraints on the process by which counterpart funds are budgeted and allocated to MIDA.

Budgets for MIDA Agencies are to be prepared and submitted by mid to late July to the MIDA/RD. The MIDA/RD budget is then submitted for review and approval by MIDA/Direccion Nacional de Planificacion Sectorial, MIPPE, the GOP's General Comptroller, and the Congress. By the time the budget has been returned to the MIDA/RD, a determination has been made as regards the size of the budget and the allocation of funds on a line item basis within the budget. While budgeted counterpart funds theoretically could be allocated to the ATT project by January 1 under this system, there are a number of constraints that preclude the likelihood of this. First, the Congress may not approve the budget until the end of the year. Second, given the current deficit faced by the GOP, the IMF's restrictions on the GOP taking out new loans, and an approximate delay of three months at the start of the year before the GOP begins to receive internally-generated funds (e.g., tax revenues), the GOP is currently operating under a severe cash flow constraint that impedes its ability to allocate funds at the year's outset. Third, as there is no restriction or law that prohibits reallocation of funds budgeted for one activity to be switched on an interim basis to support another activity, the GOP has little choice but to allocate available funds to those activities deemed to have higher priority than others. Fourth, the budget actually approved for the project is generally significantly below that which the project requested. Furthermore, the funding level actually received by a project can be significantly less than that approved in the budget. For these reasons, the ATT project has been subject to serious shortfalls and delays in the receipt of counterpart funding.

2. Annual Operating Plan (POA)

The ATT project has decentralized to the Agency level responsibility for preparing the Agency POA and supporting budget. During 1985, a significant portion of the resident consultants' time was spent training project staff and Agency chiefs in the logical framework methodology used in preparing an Agency POA. This approach to preparing the POA is being implemented only in Chiriqui and not the other two project sites.

This year the Agency POA was developed by the Agency chief in consultation with his staff and the project coordination team. Once completed, the POA submitted to the ATT project office for review by the project's administrative and planning staff, supported by the resident consultants. The ATT project office combine the individual Agency POAs (and budgets), plus individual POAs for the project's planning, training, extension (mass media), marketing, and

administrative units, into a single POA/Budget. The combined POA/Budget for Chiriqui was sent to the MIDA/RD for approval, and then to MIDA/SENEAGRO, where it was combined with the budgets for the two other project sites (Parita and Tres Quebradas). The final POA/Budget was then forwarded to USAID/Panama.

The project work plan contains a great many assumptions about the adequacy of staff and resources for operations that have not been met in the past. The plan is specific, with deadlines for action to be taken and the responsibility fixed. However, since the agricultural year ends late in the calendar year, an early submission of the POA/Budget precludes the incorporation of the results from one year in the planning of the next. Thus, in Region 1, Agencies will be putting together the 1987 POA/Budget before the results of the 1986 demonstrations plots are known. More flexibility and less detail in the allocation of funding is needed to ensure that the project is able to execute next year's field work based on the results of this year's field work. The POA should be kept simple to allow for reprogramming at the agency level.

3. Financial Management

Although the AIT project has sought to establish an independent financial management and purchasing units within the project coordination team, management of the project's finances is centralized in the MIDA/RD. MIDA regulations require that standard procedures be followed. The complexity of the financial management system under which the project (and all of MIDA) operates can be appreciated by tracing the sequence of steps (see Annex V-C) which must be followed in order for an Agency chief to effect a purchase.

Based on discussions with AIT project personnel, an average of twenty-two working days are needed for a check to be issued. Often the process takes more than a month. A pending change in this system will, project officials believe, increase the number of steps and time required for a check to be issued. Project management must plan and request purchases with sufficient lead time otherwise field frustration will continue. MIDA must streamline procedures to speed financial transactions while maintaining proper controls and fulfillment of GOP legal requirements.

The Project Coordinator and the USAID/Panama project officer have established systems for allocating project funds to the project sites as well as revolving and petty cash funds, to expedite financial management within the project. Currently, counterpart project funds are allocated by MIDA's national financial management unit, as follows: Chiriqui (80%), Parita (10%), and Tres Quebradas (10%). The project's revolving fund (Loan funds) has been increased from US\$74,700 to US\$150,000 (to cover a three-month period). In order to expedite minor expenses a petty cash fund was approved for Type A agencies (US\$500) and Type B agencies (US\$300).

It appears that the vouchers are often tied up in MIDA's national office of finance. The Regional Project Coordinator, under the direction of the MIDA/RD and USAID/Panama, had negotiated for a 5-day turnaround on vouchers. Project liquidity problems occur not only because MIDA is slow in forwarding vouchers to USAID/Panama but also because MIDA is slow in forwarding reimbursement checks to the project. Once again this is a matter for MIDA to consider, there is no shortcut.

C. Technical Assistance

1. Long-Term Technical Assistance Team (Chemonics International)

The ATT project was initiated in September 1982, without the inclusion of a long-term technical assistance component in the project design. Based on an early evaluation of the project, a recommendation was made that the project be amended to include a long-term technical assistance component. Subsequently an RFTP was issued to invite technical proposals for provision of this component. Based on the submitted proposals, Chemonics International was selected to provide the long-term technical assistance team for the project, as well as recruitment and programming of short-term consultants needed by the project. The Chemonics contract runs through September 1988.

The resident consultants fielded by Chemonics are:

Jack D. Traywick, Team Leader and Specialist in Agricultural Extension Administration (arrived in-country December 1984)

Francisco Rodriguez, Deputy Team Leader, Agricultural Extension Training and Education (arrived in-country November 1984)

The work load for this two man team is well above a level which allows adequate attention to anything more than immediate problems. The evaluation team considers the addition of a third member a necessary step to relieve daily pressure in the field and to provide a backstop to the other two members in the event of illness, vacation, or non-routine activities such as preparation of Annual Work Plans.

2. Short-Term Technical Assistance

Various short-term consultants have assisted in the implementation of the ATT project. These consultants have worked in five areas: (a) program and community development; (b) administration, planning, fiscal matters, and operational efficiency; (c) communication, audio-visual, and concept design; (d) horticultural production and processing; and (e) agricultural marketing. Following is a short description of these activities:

Program and Community Development

A community development specialist worked with the project for nearly a year conducting studies to assist the project in organizing local agricultural committees (CALs) to provide guidance on program development and evaluation. The MIDA/RD ordered this initiative to be suspended.

Administration, Planning, Fiscal Matters, and Operational Efficiency

An administrative and fiscal specialist has worked with the project for approximately five months, spread out over several assignments. Additional visits by this consultant are scheduled through July 1, 1987. Feedback from ATT project staff and USAID/Parana officials indicate that the technical assistance in this area is highly valued and has been productive in developing the project's capability to function effectively in a difficult institutional environment. To be sure, the real payoff on technical assistance in this area must ultimately be measured in terms of the extent to which the GOP is able to institutionalize improved management systems within MIDA.

It is apparent, however, that the ATT project has faced great difficulty in achieving more effective project administration. The administrative and fiscal specialist has provided additional training to project staff in order to get back on track certain administrative procedures that seem to be constantly forgotten, confused or changed.

While the assistance provided by the administrative and fiscal specialist has made significant contributions to the training of project staff and implementation of improved project administration, there remains a question of why an expatriate consultant is training MIDA staff in the use of their own system.

Communication, Audio-Visual, and Concept Design

Three communication and audio-visual specialists have provided three months of consulting services to develop and conduct training programs (short courses) on the utilization of mass media (radio) and audio-visual (e.g., slides) tools in support of technology transfer. This training was well received and has provided the project with some skills that now need to be effectively incorporated into the implementation of the project's technology transfer methodology (i.e., participation of farmer promoters in demonstration plots, communication of technical information through field days and group meetings, etc.). Programming of the specific activities to be developed by the project's communication unit should be coordinated with the requirements of the annual work plans of the individual agencies. Additional consulting assistance in the communication area should be carefully programmed to agree with the implementation schedules of these work plans.

Horticultural Production and Marketing

Technical assistance in this area has been provided by two consultants, one a vegetable production specialist who worked with the project for approximately four months, the other a fruit production specialist who was in the midst of a two-month consulting assignment during this evaluation. Technical assistance in this area is needed to provide guidance on the production areas having comparative advantage for the production of fruits and vegetables, to assist in the identification of production technologies available and required, to assist in the training of production specialists and extensionists in vegetable/fruit production management systems, to assist in the establishment of training and demonstration plots, and to prepare production manuals for priority fruit and vegetable crops.

Additional technical assistance in this area is scheduled (2 months by the fruit production specialist), and should be coordinated with the marketing work being developed by the project. Selection of the specific technologies to be transferred by the project should be made in collaboration with IDIAP as part of an on-farm adaptive research program. In the future, the MIT project should increase involvement of technical expertise of IDIAP and the FAUP. Short-term consultants provided by the contractor should be used sparingly and in fields of expertise that are not available from other resources. This will free up funds and contribute to the development of important operational linkages critical to the attainment of the project purpose.

Agricultural Marketing

An expatriate short-term agricultural marketing consultant worked with the project for approximately six weeks. The project also hired a Panamanian who worked with the project on a short-term basis for nearly two months. There is no doubt that understanding the markets, involving questions such as quality standards and marketing methods are an important part of having a profitable farm.

The Agricultural Cooperatives Marketing project can provide excellent support in this area, and the extensionists should avail themselves of this resource. The project should not attempt, however, to develop and extend its own marketing expertise as this would replicate other efforts and could threaten the delicate technical relationship between farmer and extensionist.

D. Technology Transfer Methodology

The strategy for transferring technological, management, and marketing information must be appropriate to the particular cultural and social system in which the strategy is to be implemented. Numerous factors, including the educational level of the farmer, the mobility of farmers and agents, past experience with transfer (extension) activities, media availability, and the complexity of the technology to be transferred, play a part in determining which strategy is most appropriate. Considerable research has been done on the subject of diffusion and adoption of innovations in agricultural technology. For example, Everett Rogers' Diffusion of Innovations compiles many years of research on the adoption/diffusion of agricultural innovations. Based on such studies, Watts and Claar (1983) identified a set of universal conditions for effective transfer of technology in agriculture. These conditions provide a framework for analyzing technology transfer strategy and methodologies, as follows:

- * The process of technology development, transfer, and utilization is a continuum which depends on many factors such as markets and agricultural policy that provides for incentives, timely input supply, and affordable credit. The best transfer strategies may be nullified by failures in these agri-support areas.
- * Personnel systems, policies, incentives, sanctions, and work habits of the culture.
- * Close linkage with a technology development system and a stock of validated technology to extend.
- * Mobility to reach farmers and participate with research. Frequent contact with the change agent was found by Rogers to be the most important factor in explaining adoption rates.
- * Involvement of farmers in the process of setting program goals and priorities and in evaluating the program and personnel greatly benefit the program.
- * It is essential that technology transfer agents have the trust and confidence of the farmer. Change agents who are technically competent in the subject matter they are transferring and who possess competency in economic analysis, communication, and even farming are perceived by farmers as having more credibility.
- * The use of field demonstrations is important in building and establishing agent credibility and in securing farmer adoption of improved inputs and practices.

- * The coordinated use of communication channels in tandem. For example, direct contact with farmers supported by appropriate messages communicated through other media such as radio steps up adoption, whereas mass media used alone heightens awareness but is not very effective in securing adoption.
- * Working through groups opens the door to utilizing group dynamics as a mechanism for speeding up the spread and evaluation of information, developing peer pressure in favor of adoption, and securing adoption by each of the group's members.

This framework provides a basis for evaluating the technology transfer strategy being developed within the ATT project in Chiriqui province and the two other project sites (Parita, Herrera and Tres Quebradas, Los Santos).

1. Chiriqui

The strategy of the project is geared to developing priorities and local work plans based on farmer needs as revealed through interpersonal contacts and surveys (sondeos). The project tried to form and/or work through local groups of farmers to assist with this process but were told to stop this initiative to involve groups .

Based on these local work plans and priorities, the project seeks to provide information to farmers to help solve the problems identified (see "An Extension Approach for Chiriqui," by Jack D. Traywick) and improve farmer income. A mix of methods is involved that relies heavily on field demonstrations to show what can be done and then to work with farmers to start from where they are, in terms of current stages or levels of use of inputs and practices, to adopt clusters of inputs and practices in stages. Local "promoters", involved with the demonstrations, are being developed to help with dissemination. Supporting mass-media (radio) and audio-visual initiatives are getting underway to reinforce this system. The approach also stresses that production should be "market-based," before the seed goes into the ground.

In comparing the current system to the conditions outlined above, the overall concepts and approaches appear sound and well-conceived. The project is very concerned with marketing considerations as well as production and is making efforts on several fronts to relate to private agri-business and farmer groups and organizations.

A serious weakness is the spotty to non-existent linkage with IDIAP. As a result, the technological content of the program is, for the most part, not based on recent on-farm adaptive research trials in Chiriqui. The ATT project reported that project personnel, in 1985, had attended once a week meetings with IDIAP to try and work out an agreement for collaboration with IDIAP. However, the IDIAP Regional Director eventually withdrew from these meetings on the basis that the proposed collaboration was not in the interest of IDIAP. However, the Evaluation Team also heard that IDIAP held a training session to which no one from MIDA came. The conclusion is that relationships are far from ideal.

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Currently the ATT project is using general publications (from IDIAP and the IARCs) as well as private agri-business and local farmer experiences as a basis for selecting the technologies to be transferred to farmers. However, this approach leaves the project in the position of establishing plots which, while they may be called demonstrations, might more appropriately be referred to as validation trials, except that these trials may lack certain controls important for establishing an ability to interpret the trials' results and using these results as a basis for formulating valid recommendations. Thus, the benefits actually being achieved are considerably diminished by the lack of linkage with and the support of IDIAP in the establishment of field plots.

It is essential that MIDA's extension workers be more effectively linked with and directly involved with IDIAP researchers in the development of on-farm, adaptive research programs having either a commodity or farming system emphasis. If linkage is not established on a continuing basis, the well can run dry rather quickly as regards available technologies that can increase farmer productivity and income-earning capability.

Selection of the technological content for the technology transfer program being implemented by the ATT project should include the systematic participation of IDIAP. Collaboration of IDIAP in the development of work plans and in reviewing and commenting on each Agency's proposed POA, should be inaugurated.

The original project design placed considerable emphasis on farmer visits as a technique. This has been reduced in favor of placing a greater emphasis on establishing demonstration plots and working with and through farmer promoters and their neighboring farmers. This approach may lead to too little use of the farm visit technique. Each extension agent is reported to be working with approximately 45 farmers although it was not clear from the available data exactly how many farm visits each agent makes per week. The goal should be at least once a month visits to a group of well-distributed farmers who are involved with on-farm adaptive research trials or demonstrations (e.g., farmers serving as promoters). This would serve to develop and reinforce good work habits, ensure that Agency staff are in touch with farmers, and speed up adoption.

The image of extension workers has been very poor in Chiriqui and confidence in and credibility of MIDA at the time the project began would probably have been rated, on a scale of poor (0) to excellent (10), at 1. Service delivery based on political affiliations is not unknown and is still a problem in the project.

In Chiriqui, the ATT project has pioneered the concept of the "special project" as a technique whereby market factors or considerations can be more effectively taken into account in identifying opportunities for technology transfer. More specifically, special project funding enables the project to locally identify and respond to opportunities to test and transfer technology that has been identified by Agency personnel and/or farmers as having potential to increase farm income given prevailing or anticipated market conditions. To date, the project has provided partial funding for several special projects to test the income-earning potential of market-oriented technological innovations such as solar-heated drying sheds for onions (or other crops), low-cost cacao fermentors, and multi-location staggered plantings of onion to develop Panama's capability to have a year-round supply of domestically-produced onions. Farmers participating in the testing of the solar-heated drying sheds estimate that losses due to poor drying have dropped from 50% of the harvest to 10% or less. It remains to be seen if farmers perceive this innovation as worthwhile of investment. Adoption should be monitored and financial studies prepared to establish simple formula for calculating the viability of a planned investment of this kind.

Ideas for special projects may be proposed by farmers, Agency extension workers, or others (e.g., cooperatives or even IDIAP researchers). Ideas for special projects must be submitted through the appropriate Agency. Currently at least one special project (year round growing of onions) involves the direct participation of IDIAP personnel who are serving in a research capacity. In developing a proposal for a special project, a number of criteria must be addressed which are set forth as a series of questions in an ATT project-prepared manual that provides guidelines for preparing and writing a proposal to request special project funding. The opportunity for extension workers and farmers to prepare a special project proposal facilitates local level and private sector involvement in the identification of opportunities for testing technologies which, if they work, will allow farmers adopting them to increase their incomes.

Finally, while the Evaluation Team feels that project's technology transfer methodology is generally on target in its approach, some adjustments are needed but most particularly in the area of strengthening the project's linkage with IDIAP's on-farm adaptive research program, and the FAUP's highly skilled faculty and excellent training facilities in David.

2. Parita and Tres Quebradas

The extension strategy in Parita and Tres Quebradas involves farm visits four days a week as the principal method of transferring technology. According to this approach, an Agency having 5 extension workers would have each worker visiting six farmers a day from Monday through Thursday, or a total of 120 farmers a week. A second group of farmers would be visited in the following week, for a total of 240 farmers visited during a two week period. Each farmer is then visited one more time during the second two week period of the month. Under this system, alternating Fridays are used for training and administrative matters (e.g., report writing).

Contact with and support from IDIAP was reported to be quite good with a signed agreement in Parita and an unsigned agreement in Tres Quebradas. Both MIDA/RD and IDIAP personnel are now involved in reviewing and commenting on the Agency's work plan as it is developed. This practice is very supportive of the linkage concept.

Both Agencies reported that they had tried to work with farmers in groups but had been unable to do so. The Tres Quebradas Agency did not seem to see any prospect for working with and through groups; however, the Parita Agency felt that as the program gains credibility over time among farmers, that it would become possible to begin to work with groups, progressively increasing each year the number of groups involved in the program. Utilization of groups to supplement the individual visits to farms should improve both efficiency and adoption.

Parita reported that it was developing a 30-minute radio program which was to be inaugurated the following Saturday; this development should be encouraged and supported.

Demonstrations are also being used by both the Parita and Tres Quebradas Agencies but to a much lesser extent than in Chiriqui. Adoption by farmers should be carefully monitored to see if the rate is significantly high to justify the intensive program of farm-level visits. It would be of interest to study and compare the training and visit methodology as practiced in Parita and Tres Quebrada Agencies with the more balanced methodology being practiced in Chiriqui.

E. Linkages with Other Panamanian Institutions

1. IDIAP

IDIAP was programmed in the design of the ATT project to play a key role in implementing the project. It was to provide, through its Technical Transfer Directorate, training, publications, and technical information for use in the Project. However, pursuant to Law 19 of October 5, 1982, this Directorate was abolished in early 1984 and the authority for the technology transfer function was assigned to the newly-created SENEAGRO. Therefore, the training couldn't come from IDIAP, MIDA funds for training were never transferred to IDIAP, and the C&E Center which was to function in IDIAP was never built.

There is ongoing informal cooperation between IDIAP and the ATT project in Chiriqui, mainly in four Agencies (Volcan, Progreso, San Andres, and Alanje). However, the general situation is that the ATT project has not been able to involve IDIAP effectively in field testing for technology validation, thereby also precluding access of the project's staff to a potential source of technical training. But even more importantly, the ATT project was left to its own devices to determine the content for its program using IDIAP publications and other resources.

Without attempting to assess blame, the situation is intolerable and IDIAP and the ATT project should agree on the technology to be extended in the Project area before another year goes by. A mutually supportive plan of work in the Chiriqui province should be insisted upon by USAID/Panama for both the ATD and the ATT projects.

In the other two ATT project sites (Parita, Herrera and Tres Quebradas, Los Santos), the relationship between the project and IDIAP is much better. One Agency, Parita, even has a signed agreement with IDIAP. In this Agency, three people carry out liaison between the Agency and IDIAP in the area of crops, livestock, and training. IDIAP personnel provide some training and review the Agency proposed work plan for the coming year.

A similar situation was found in Tres Quebradas, where IDIAP personnel provide training and technical review of the Agency's work plan. The system must provide for no less in Chiriqui and the goal should be a close linkage between technology development (IDIAP), technology transfer (MIDA), and farmers.

2. MIDA Regional Directorates

The ATT project was designed with the MIDA Regional Director as the director of the project. But it was recognized that the Regional Director had other roles and not enough time to give to directing the project on a daily basis. Consequently, the position of Regional Project Coordinator was created. In Parita and Tres Quebradas, the Regional Project Coordinator is in each case also the head of the individual agency and functions in the normal line system of the region. In Chiriqui, the Regional Project Coordinator is responsible for developing the project across ten Agencies but has no other position in MIDA's regular organizational structure. Although many of the same problems were observed at all three project sites, the level of friction was much higher in Chiriqui, where the Project Coordinator is supported by a corps of MIDA and expatriate staff and the project was designed with the intent of having considerable autonomy in order to be innovative both in program implementation and administration.

Possible explanations for the higher level of friction in Chiriqui may include the following considerations:

- * The project covers to a greater or lesser extent each of the ten agencies in the region. The project develops a plan of work with the local agency personnel and finances them in carrying out this work plan, so that they are quite independent relative to their normal relationship with the MIDA/RD that had formerly been more directly involved in supervising the Agencies prior to the project's inauguration. In a sense the local staff have been partially shifted into another line of leadership which is not in the normal administrative line of the region.
- * The project personnel are relatively well financed, while the MIDA/RD has almost no resources with which to operate. There is great pressure on each of the MIDA/RDs to use the project's funds as broadly as possible. In fact, the Evaluation Team was told that there are those in the MIDA/RD who feel that the project's funds should support all of MIDA in Chiriqui. This built-in conflict can become serious and threaten the tenure of the Project Coordinator.

The project paper, while stating that the project should function within the framework of the MIDA/RDs, but with an appropriate measure of autonomy, left too many details unspecified as regards how this balance could be achieved. The administration of a project always put pressure on the resources of the technical unit implementing the project. Perhaps this should be recognized and some funds made available each quarter to the MIDA/RD to help cover these costs. This might provide for incentive for prompt processing of reimbursement requests to USAID and disbursement of project funds. An excellent indicator of official interest in the project will be the administrative agility of MIDA in processing project funds.

3. Banco de Desarrollo Agropecuario (BDA)

The principal source of production credit in the project areas is the Banco de Desarrollo Agropecuario (BDA). The ATT project has experienced two success stories in leveraging BDA support of project initiatives. Success in field testing onion drying and storage sufficiently impressed the BDA that it decided to make production loans to onion growers only if they have on-farm storage capacity. If the loan applicant does not have a storage facility, the bank now requires that the loan be increased by an amount that would allow the farmer to build a storage/drying facility. Another case of institutional leveraging of credit was found in the case of an extension agent in Progreso who convinced the BDA of the income-increasing potential of a technological package which the project was seeking to transfer to banana producers. In turn, banana producers who were sufficiently convinced of the income-increasing potential of the package applied to the BDA for a production loan. With the certainty that the ATT project would be providing the growers with technical assistance on the improved technology, the bank was eager to make the loans to the growers.

It appears that the ATT project is gaining credibility with the BDA . In Chiriqui (two regions), Parita, and Tres Quebradas, the BDA has told the project that it plans to withdraw from making technical recommendations for production loans and will look to the project for guidance on the recommended technology to be used by farmers receiving production credit loans. Increased IDIAP participation will be critical to long term success and the BDA should demand it.

4. Producer Associations

The ATT project is not currently working with producer associations. Informal discussions and meetings have been held with some representatives of these associations. The possibility of developing special projects has been explored but no formal program has been planned. Although the project's technical assistance team believes that there is potential for producer associations to participate in the project, the project's initiatives to establish such collaboration have been thwarted on numerous occasions, the reason apparently being that the membership of these producer associations is comprised of the medium to large farmers who are politically active and almost always critical of government policies affecting their particular product. This confrontational posture is a standard tactic for such groups that seek to use their political clout to improve their business through obtaining the greatest possible level of government support.

The ATT project is aimed primarily at small and medium size farmers on a geographical basis (local agencies). Until a larger scale capability is built up within MIDA, commodity specific programs should not be considered unless requested and even then only with the direct involvement of IDIAP.

5. Farmer Cooperatives

Compared with the problems the ATT project encountered in attempting to work with producer associations, more progress has been made in developing collaborative linkages with cooperatives in the Chiriqui region. In Boquete, the project is exploring the possibility of working with a vegetable marketing cooperative (Cooperativa Horticola de Mercadeo) on a radio program to transfer information from the adaptive research program being developed by IDIAP in collaboration with the cooperative. In Bugaba, the project is working with a dairy cooperative to extend technical assistance on artificial insemination; the project provides a vehicle and the technical assistance, while the cooperative provides the fuel and equipment for insemination. In Rio Serena, the Cooperativa Eianca Flor obtained a loan for a coffee drying facility; the ATT project is assisting in the development of this enterprise by providing cooperative members with technical assistance on coffee production. In Parita, the ATT project is exploring ways to provide technical assistance to a melon producing and exporting cooperative Union de Cooperativistas Agropecuarias Panameños para la Exportacion (UCAPE).

The ATT project should continue to pursue identification of opportunities to involve farmer cooperatives in developing Agency work plans, particularly where a cooperative is able and willing to defray some of the costs associated with providing technology development and transfer assistance. An excellent example of the kind of working relationship which can be achieved is illustrated by the vegetable marketing cooperative in Boquete which is providing an office and other material support to assist the ATT project in developing an adaptive research program on onions. This potential for extending validated technology to cooperative members should serve as an incentive for the ATT project to assign project extension workers and/or technical specialists to work directly with the ATT project in carrying out on-farm trials of the technology being evaluated. In this way, technology transfer personnel of the ATT project will acquire a thorough knowledge and understanding of the technology and thereby will be better prepared to extend the technology to larger numbers of farmers.

6. Facultad de Agronomia de la Universidad de Panama (FAUP)

Located near David, the FAUP is ideally located to play an active role in the ATT project. The project has made an agreement with the FAUP which allows 12-18 of the project's extension personnel to further their education through a program of special evening and weekend classes. The project was only able to get permission from the MIDA/RD for only three Panamanians to attend classes and they are doing so on a regular basis, with allowed time off from work. The agent's program of study is to be supplemented by participation in a technology transfer project that would be carried out at the Agency level (e.g., demonstration plots).

There are many problems in the field and the ATT project is in an excellent position to bring these problems to the attention of those in the Faculty who could make some of these problems the focus of research studies, theses, or special projects. The ATT project should continue exploring ways to get the FAUP involved in the project; at a minimum, the project should aim at involving the FAUP in planning and implementing at least one joint project in 1987.

7. Instituto Nacional de Agricultura (INA)

The ATT project is not currently developing any programs with the INA, largely because of INA's location at Divisa which is outside the project's areas of operation.

F. Problems and Constraints

Although the ATT project has made significant advances, it continues to suffer a series of problems. Despite important accomplishments, the project is nearly two years behind schedule in its implementation. The project has had its vehicles for only a little over a year. In both 1985 and 1986, counterpart funds for operating expenses did not become available until late June or early July, well after the time that these funds should have been available for timely implementation of the project's field activities. Because of the delay in receipt of counterpart funds in 1986, the project was only able to continue operating in the field (e.g., conducting training, establishing demonstration plots) because USAID/Panama intervened to allow project funds to be reprogrammed to support implementing extension activities in the field. This intervention came just in time to permit the project to establish the field demonstration program for the current growing season.

In addition to the problem of limited counterpart funds reaching the project, there are a number of other major constraints and issues that need to be addressed.

1. Lack of Effective Linkage of ATT Project with IDIAP

- MIDA and IDIAP have not been able to agree on a systematic approach for involving IDIAP personnel in providing the project with technical support (e.g., training of project personnel).
- There is a lack of systematic feedback to IDIAP on the project's field experiences and the use of such information to prioritize, design, and implement IDIAP's on-farm adaptive research program. There is ample room for program planning to take into account identified farmer needs, market conditions, and government policy affecting incentives and disincentives.

2. Continuity of Leadership

- There has been instability of leadership at the regional and national levels. During the project's life, there have been four Ministers, two directors of IDIAP, three directors of SENEAGRO, four MIDA Regional Directors, and two Regional Project Coordinators (in Chiriqui). Numerous staff changes have occurred within USAID/Panama during this same period, including four project officers, three Chiefs of the Office of Agriculture, and two Mission Directors. Moreover, the ATT project and the Agricultural Technology Development (ATT)

project (evaluated in Chapter IV) are managed by two different USAID/Panama project officers. Each project officer reports to a different supervisor (the ATT project officer to the Deputy Chief, Office of Agriculture and the AID project officer to the Chief, Office of Agriculture). Clearly, such a pattern of leadership for the development of an agricultural technology development and transfer (ATD&T) system does not provide for the continuity of leadership and coordination essential for enhancing the system's productivity.

- Leadership of the ATT project at the national level has been in a state of flux; indeed, SENEAGRO's Director was changed during this evaluation. Also, MIDA did not provide SENEAGRO with any funds to support the project at the national, regional, or Agency levels (e.g., consolidation of work plans, development of training programs to meet identified needs at the regional and Agency levels, etc.).
- The project design overestimated MIDA's ability to support the project (i.e., counterpart funds) and left the relationship between the MIDA/RD and the Regional Project Coordinator too loosely defined.
- The ATT project is caught in a struggle in which various factions in MIDA want to establish increased centralization of control over the project's direction, resources, and management. One area at issue is whether the project should allocate its scarce resources to attend to the asentamientos.

3. Organization of MIDA

- The current organization of MIDA does not provide for high-level leadership of the technology transfer function. There is a National Directorate for Agricultural Extension but this directorate is at the same level as several other national directorates. Also, MIDA'S current approach is a top-down system designed to manipulate farmers to adjust their farm decisions to the requirements of production targets set forth in the five-year plan. This approach fails to recognize that farmers are the "gate keepers" to change and make their production decisions based on criteria more important to them than a plan's production targets. The system which appears to be evolving nationally is in sharp contrast to the methodology being implemented in the ATT project.

- MIDA's organizational structure mixes the technical transfer function with regulatory and political functions at all levels of MIDA. These functions do not make good "bedfellows" for the technology transfer function and impede its effective and credible linkage with IDIAP and the private sector (farmers, agri-business).

4. Inputs to Program Development

- Lack of organized council from farmers and other agricultural organizations at any level. The Project was ordered by the MIDA/RD in Chiriqui to stop work on organizing the Local Agricultural Committees (CALs) envisioned by the project design as a key element in guiding program development.
- While the ATT project has attempted to involve IDIAP in the review of the Agency-level work plans, the project does not make any direct input into the development of IDIAP's on-farm adaptive research plan for the Chiriqui region.

5. Training of Personnel

- While formal training is being provided through both long-term and in-service training, there is a need to involve IDIAP's technical personnel in the implementation of in-service training programs.
- The planned corps of technical specialists (n = 24) only numbers 5 at the Chiriqui regional level plus a few more located in the different Agencies. This corps of technical specialists will be developed through implementation of the project's long-term training plan. In the interim, there are several priority areas in which expertise required by the project is not available within MIDA (e.g., fruit production, production economics, marketing).

6. Personnel Management

- Individuals are often assigned to the project without any consultation with the Project Coordinator as regards the project's personnel needs or the ability of assigned personnel to meet these needs.
- There have been instances where personnel trained by the project have, upon completion of their training, been reassigned by the MIDA Regional Director to project positions having no relation to the training received or have been reassigned to other positions in MIDA.

- There is no evaluation system in the project or in MIDA and there is little incentive for taking on more responsibility or performing exceptionally well.
- Salaries appear to be capricious, with the Project Coordinator paid at a rate that is less than the salary received by people below him (e.g., secretaries).

7. Financial Management

- Counterpart funds for operating costs are not received until mid-year or, if received, are less than the amount approved for the project. Further, when funds do arrive, the project does not have adequate control to ensure that MIDA does not divert funds to activities outside the project. Also, the project must meet very unreasonable requirements to be able to spend budgeted funds. The project's administrative and fiscal consultant indicated that MIDA's financial management system is not able to process the funds quickly enough to meet project needs in a timely manner.
- The special financial management procedures required by USAID/Panama in the project agreement were prepared but never adopted because of a failure on the part of the project, MIDA, and USAID/Panama to work out an agreement to ensure their implementation.
- There is duplication of administrative functions between the project and the MIDA/RD levels and this duplication slows down project implementation.

These problems and constraints represent, in large part, that the project's design did not anticipate the difficult and changing institutional environment in which the project would be implemented. It is clear, in view of these many problems and constraints, that the ATT project is being implemented in an environment at odds with the institutional conditions essential for a productive ATD&T system. Major changes are needed to reconcile these differences.

Since its inception the ATT project has been fraught with political and administrative problems that have impeded the flow of resources and the actions essential for project implementation. MIDA's attitude toward the project often appears to be at odds with the project design. For example, the Evaluation Team heard reports that project funds have been used for non-project activities, that project staff were ordered not to form or work with local agricultural committees, and that MIDA officials have been reluctant to work with private sector groups. Further, it is apparent that MIDA is oriented to implementing a top-down model of agricultural development, in which the primary role of the ATT project is to develop extension's capability to assist farmers in meeting production targets set by national

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planners. The project, in contrast, seeks to develop locally-planned, farmer-oriented technology transfer activities directed to increasing agricultural productivity and farmer income.

Beyond the problem of MIDA's attitude toward the project, resources have not flowed evenly to the project. The counterpart funds provided by the GOP to meet project operating costs have been less than the GOP's obligation. Further, counterpart funds are not received in a timely manner. Even when funds are allocated, there have been various problems in getting these funds down to the project level. The problem is aggravated by the fact that the system for making purchases and expenditures is very cumbersome and turnaround time is extremely slow. These problems, plus the stress of current financial constraints, have severely impeded the implementation of the ATT project.

The project also faces problems in terms of the number and kinds of personnel assigned to the project and the incentives project personnel have to perform with excellence. While MIDA has begun to place a greater emphasis on technology transfer, MIDA does not appear to recognize the urgent need to separate this technical function from MIDA's regulatory and political functions. Commingling of technology transfer with MIDA's highly politicized activities, under a personnel system that provides no incentives for excellence in performance, makes establishing credibility with farmers and the private sector very difficult.

Further, the Evaluation Team is concerned that the ATT project has not been more effectively linked with the ATD project. This problem, however, is symptomatic of two even more basic problems. First, there is a lack of effective collaboration between IDIAP's on-farm adaptive research program and MIDA's extension service. This problem is due, in part, to a number of unresolved issues that arose during the project's implementation. One issue involves whether the technical support for the training of extension workers would be the responsibility of MIDA/SENEAGRO or IDIAP. Another key issue revolves around the question of whether MIDA/SENEAGRO should have used ATT project funds to reimburse IDIAP for the provision of needed services.

The second basic problem is that USAID/Panama is not effectively coordinating these two projects (ATD and ATT) that are providing substantial support to both IDIAP and MIDA. Two specific examples of areas in which improved collaboration and coordination could significantly enhance the performance of Panama's ATD&T system are: (a) the process by which decisions are made about the crops for which improved technologies will be developed and transferred (e.g., corn and beans vs. high-value market crops such as melons); and (b) the process by which decisions are made about the short-term consultants to be brought in to support each of the projects (e.g., to ensure that each consultant plays an effective role in helping to "build bridges" between IDIAP and MIDA).

Beyond the need to establish closer collaboration between the ATT project and IDIAP's on-farm adaptive research program, the project's methodology for carrying out technology transfer to farmers is generally sound. However, in reviewing the ATT project, the Team found that the USAID funds originally budgeted to support the project will not be sufficient to carry it through to

the PACD. Specifically, adjustments in USAID/Panama programming of funding support to the project will be needed to ensure continuity in project implementation and the achievement of project objectives. The key project inputs for which USAID/Panama funding support is currently underbudgeted are technical assistance, training, and extension activities.

G. Log Frame Analysis

1. Divergence from the Original Project Design

The design of the ATT project, as originally conceptualized in the project paper in 1982, is considered generally sound. The problems encountered by the project have been less a factor of inadequate project design and more the result of constraints in the institutional environment that have impeded implementation of the project design. Key failures in project design or implementation are now reviewed.

The National Supervisor for the ATT project never had the authority or resources to establish an effective linkage between the project and IDIAP, or to provide the needed technical support through other mechanisms. Without this effective linkage, cooperation and mutual support between IDIAP and MIDA never materialized to the extent that is needed. On the other side of the coin, the liaison officer for the project within IDIAP was never appointed or, if appointed, has never played an active role in facilitating linkage of IDIAP with the project.

The original project design called for IDIAP's technology transfer unit to provide technical training to project staff and assistance in selecting the technologies to be transferred to farmers by the project. This design was compromised when IDIAP's technology transfer unit was abolished and SENEAGRO was created in MIDA. The failure to work out an agreement to ensure effective linkage of IDIAP's technology development capability with the project's technology transfer capability dealt a serious blow to the project's implementation.

The idea of working through the system (the MIDA/RDs) but with a separate fiscal and purchasing system was never effectively established. MIDA's national-level administrative units has been a serious bottleneck in project implementation, while the MIDA/RDs have impeded the project's ability to develop as a non-politicized, technical thrust involving private- as well as public-sector organizations.

The original design placed a great deal of emphasis on farm visits. Farm visits are important in building up contacts with farmers and for the creation of a positive image relative to the negative one MIDA has acquired over the years. However, the goal should be a balanced program that includes the involvement of farmer organizations and private agri-businesses in setting program priorities, participation of extension personnel in IDIAP's on-farm adaptive research programs to validate technologies, establishment of farmer-managed demonstration plots, group work using the demonstration plots, selective and targetted utilization of the mass media (e.g., radio), and innovative special projects that reward imaginative action to exploit comparative advantage and market opportunities.

The original project design envisioned that 24 technical specialists would support the project. Progress toward meeting this goal will be made as the Panamanians receiving long-term training complete their studies and return to Panama to work on the project. In the interim, MIDA has failed to provide adequate technical support to the project.

The MIDA/RD in Chiriqui prohibited the project from engaging in activities to organize the CALs and get other farmer groups (e.g., producer associations) involved in setting program goals and evaluating program activities. This decision was unfortunate precisely because it prevented the project from involving Panama's private sector more actively in the implementation of the project.

The literature on administration of public organizations identifies certain pre-conditions for effective linkage between two organizations (e.g., MIDA and IDIAP), as follows:

There must be mutual benefit. Two organizations are more likely to be convinced that they stand to gain mutual benefits by linkage if they perceive that they share a common mission and that each needs the other to achieve that mission. In the case of IDIAP and MIDA, this common mission must be increasing farmer adoption and use of productivity-increasing, per unit cost-reducing technologies beneficial to consumers as well as producers. However, the Evaluation Team feels that IDIAP and MIDA have yet to perceive or reach a consensus on what their common mission is.

There must be mutual respect. On the technology transfer side, this can be achieved if extension personnel (1) work with researchers in the development of on-farm adaptive research programs; (2) develop competency to manage validated technologies under varying farm-level conditions; and (3) implement programs for moving validated technologies through the technology transfer system to farmers. On the technology development side, researchers need to understand that their job is not complete until improved technologies are disseminated to and adopted by farmers.

There must be a balance of power. Within the public sector component of Panama's ATD&T system, agricultural teaching is primarily located in the FAUP, agricultural research in IDIAP, and agricultural extension in MIDA. None of these institutions, however, has sufficient power or the delegated authority to ensure that Panama's ATD&T system is developed in a way that is responsive to the technological needs of Panama's farmers. Further, while IDIAP was established by the GOP as an autonomous and relatively depoliticized research institute, the GOP subsequently took the technology transfer function out of IDIAP and placed the responsibility for this function within a highly-politicized governmental ministry (MIDA).

It is difficult, if not impossible, in such a highly politicized environment for technology transfer to be developed as a technical function that is effectively linked with technology development and agricultural teaching. Moreover, Panama's private sector, including farmers as well as representatives of agri-business firms, does not express any confidence in or willingness to support technology transfer if this is the responsibility of MIDA. There is, therefore, a total absence of any authority to coordinate the

development of Panama's ATD&T system, with an almost complete breakdown of the linkages between technology use (private-sector farmers and agri-businesses) and technology transfer (MIDA), and between technology transfer (MIDA) and technology development (IDIAP).

2. Current Relevance of the Original Design

The goals of the ATT project remain relevant to the needs of Panama. There is, however, a recognized need for the project to place a greater emphasis on developing the farmer's capability to produce high-value domestic and export crops, without abandoning efforts to improve basic food crop production and productivity. In view of the more market-oriented pricing system that is now being unleashed in Panama, greater priority should be placed on getting more production economics and commodity-specific production and marketing expertise brought to bear on the project. This expertise is needed to ensure that adequate priority is placed on gearing the project's technology transfer activities to market opportunities and requirements.

In this respect, the "find the market, then produce" concept being developed by the ATT project is on target. This approach, however, must be carried two steps further: (a) to link the project's technology transfer function more effectively with IDIAP's technology development function; and (b) to link the technology development and transfer functions with the agricultural education function of the FAUP.

The ATT project, as currently structured, is being implemented in MIDA. As previously documented, MIDA has stood as an obstacle in the way of developing a depoliticized technology transfer system. Further, the ATT project has not been able to develop an effective linkage with IDIAP's technology development function. Consideration of these realities by the Evaluation Team have led the Team to question if there may be an alternative way in which public-sector authority and responsibility for the technology transfer function could be (a) depoliticized, (b) more effectively linked with IDIAP's technology transfer function, and (c) more efficiently targeted to meeting the technological needs of farmers and other clientele. Part of the answer lies with plans for the future and how they address these issues. The following section provides a brief evaluation of the draft MIDA proposal for a National Service for Training, Technology Transfer and Technical Assistance (Servicio Nacional de Capacitacion, Transferencia de Tecnologia y Asistencia Tecnica). This draft MIDA proposal takes the position that the authority and responsibility for the technology transfer function should be organized within MIDA.

3. Potential Changes in the Project Environment

Law 2, of March 20, 1986, assigned public-sector authority and responsibility for the technology transfer function to MIDA. MIDA has experienced major difficulties in developing the technology transfer function (e.g., the apparent failure of SENEAGRO and the highly-politicized nature of the MIDA/RDs). MIDA is currently attempting to address these difficulties by implementing a reorganization that establishes seven equivalent National Directorates (Direcciones Nacionales). As part of this reorganizational process, MIDA is currently reviewing the aforementioned draft proposal for a

National Service for Training, Technology Transfer and Technical Assistance. This proposal, in the view of the Evaluation Team, has three major weaknesses which make success in technology transfer doubtful. These shortcomings are summarized below.

First, the proposed structure of leadership for the development of the technology transfer function does not provide a strong center of authority and technical competence that is responsive to agricultural priorities as set by small- to medium-sized producers, farmer groups or organizations (i.e., cooperatives, producer associations, etc.), and agri-business firms. The proposed coordinating committee ("Comite de Enlace Tecnológico") fails to address the need for MIDA and IDIAP to collaborate in the development of on-farm adaptive research programs that link the technology development and transfer functions. Each of these functions is incomplete without the other and any structure which fails to provide for their effective linkage and functioning as a mutually-reinforcing continuum cannot be an effective vehicle for developing and transferring agricultural technology to farmers.

Second, as described in the proposal, the technology transfer function and the personnel responsible for implementing this function will continue to be mixed in with operational units that have political, regulatory, and other functions to perform. Some of these functions are incompatible with technology transfer as a technical function that must have credibility with farmers. This commingling of functions at the regional level can be particularly damaging to the ability of technology transfer personnel to establish their professional credibility with farmers.

Third, the reorganization of MIDA, as described in the proposal, is highly oriented to building MIDA's capability to implement a top-down model of agricultural development in which national production targets are set at the national level and it becomes the role of extension to motivate farmers to achieve those goals. This approach fails to recognize that farmers, as the "gate keepers" of agricultural change, have their own objectives which they are trying to achieve. National planning is certainly needed but it should speak to farmers through the establishment of an agricultural policy environment that provides incentives for farmers to increase the technical and economic efficiency of their farming systems. Experience the world over has shown that extension is effective when it works with farmers to help them achieve their income goals rather than national production targets. This requires local planning and priority setting with producer involvement.

As compared with the concepts elaborated in the draft "Servicio Nacional" proposal, the Evaluation Team believes that the approach to technology transfer being implemented by the ATT project is technically on target, with the exception that the project needs to improve its linkage with IDIAP's on-farm adaptive research program.

Overall, the design of the project in 1982 was fundamentally sound in terms of inputs to achieve outputs. The design even provided for linkage with IDIAP but this was never effectively established for various reasons. However, the project was very slow in getting started and an early evaluation of the project indicated that the project would benefit by the addition of a long-term technical assistance component. An expatriate

technical assistance team (2 members) was added to the project in 1984. The team is completing its first full year of on-farm activities and there is concern that a third member should be added to the team to ensure adequate technical leadership, training, and supervision of extension activities in the field.

USAID financing to the project appears to have been carried out expeditiously and standard control measures have been applied. GOP financial management processes have been cumbersome. Notably there have been delays in the availability of GOP counterpart funds at the beginning of each GOP fiscal year. Additionally, there are indications that some GOP counterpart resources have been applied to activities (e.g., staff services) which are only marginally related to the project and make little or no direct input to project implementation. The project officer (within USAID/Panama) and the project coordinator (within MIDA) have stayed fully apprised of these difficulties and have continued to work out interim measures to deal with the problem. In one instance, for example, USAID/Panama authorized that project funds could be reprogrammed early in the fiscal year to cover project operating costs which are a GOP responsibility, subject to direct repayment by the GOP when funds become available later in the fiscal year or "repayment" through the device of an equivalent reduction in a USAID/Panama quarterly contribution later in the fiscal year.

The Evaluation Team believes that such interim measures do not really address the problem of finding a way to achieve full and timely commitment of GOP counterpart funding to the project. A formal and systematic procedure (e.g., a timetable for meeting the counterpart funding obligation) needs to be established to provide USAID/Panama and the GOP with guidelines for project-related decisions by the Mission when the GOP is not forthcoming with the counterpart funds that the government has agreed to provide to the project. The establishment of such guidelines will provide both parties with an improved capability to anticipate potential difficulties and adequate lead time to take the necessary corrective action to preclude serious problems. These guidelines are required to ensure that there is a clear understanding between USAID/Panama and the GOP that each party's respective contribution to the project will be made in a full and timely manner as committed in the original and amended Project Agreements.

H. Recommendations

1. Introduction

Despite the problems and constraints reviewed in section C, the Evaluation Team believes that the MTT project is helping Panama to develop an effective AID&T system that can assist various farmer audiences and clientele groups in gaining access to those technologies that can best build on Panama's comparative advantages and market opportunities. These audiences and groups include:

- * The large number of producers operating small- to medium-sized farms producing basic food crops, particularly grains;
- * Producers of specialty commodities (e.g., fruits, vegetables, beef) for domestic or export markets;
- * Large farmers producing crops and/or livestock;
- * Members of campesino organizations; and
- * Agricultural professionals in governmental and semi-autonomous organizations (EDA), commercial banks, and cooperatives and agri-businesses involved in agricultural marketing, food processing, and supply of production inputs (seeds, fertilizers, agro-chemicals, machinery, feed, etc.).

The Evaluation Team believes that Panama's AID&T system can most effectively assist these audiences and groups to access the required technologies by developing highly focused, on-farm adaptive research and technology transfer programs for those commodities having the greatest domestic and/or export market potential.

The collaboration of MIDA's extension personnel with IDIAP's researchers in designing, implementing, and evaluating on-farm adaptive research programs can be an effective tool for training extension personnel and disseminating validated technology to farmers and other clientele (e.g., agribusinesses). Through their participation in on-farm validation trials researchers gain knowledge and understanding of the farm-level conditions that impact on a technology's productivity and income-earning potential. At the same time, extension personnel gain the practical knowledge essential for developing production-oriented training programs that can be used to increase the number of trained extension personnel competent in managing improved technologies under varying farm-level conditions. In this manner, extension personnel become better equipped to transfer improved technologies to farmers. Of course, integrating this practical knowledge into the FAJP and providing mechanisms for the FAJP's participation in this process are essential.

2. Recommendations for the ATT Project

As previously noted, the Evaluation Team believes that the ATT project is contributing to the development of Panama's ATD&T system. In particular, the ATT project is assisting MIDA to develop its field extension service capability. Of note, in-service training has been intensive, a "market led" program of field demonstrations is being implemented, and farmers are increasingly being involved in project planning and implementation. Further, there are early signs that the project is having an impact on farmer adoption of improved technology and that the project is starting to develop credibility with the private sector. The ATT project, in many ways, is poised for progress.

Although the project yet faces many problems, the problems are not insurmountable. Further, considerable resources have been invested to bring the project to this juncture where it is now starting to make an impact in the field. However, the problems facing the project do need to be solved in order to facilitate continuity in project implementation, to achieve the project's objectives, and to lay the institutional base necessary for the project to evolve into a national agricultural technology transfer system.

Accordingly, the Evaluation Team recommends that USAID/Panama should provide continued support to the project through the PACD of September 30, 1989, with the long-term technical assistance component also being continued .

However, the Evaluation Team firmly believes that continued USAID/Panama support to the ATT project must be made contingent upon the commitment of the GOP to assume responsibility for meeting the project's counterpart funding obligation in a full and timely manner.

To this end, the Evaluation Team recommends that USAID/Panama should establish that the ATT project will not be continued unless:

- a. The GOP has demonstrated by the end of the first quarter of 1987 that it has been able to meet the project's counterpart funding requirement ; and
- b. The GOP has established a timetable for and taken significant steps toward implementing institutional reforms that effectively resolve the problem areas (see items a to d below) that have plagued the ATT project.

In the event that the GOP has not met these conditions, the Evaluation Team recommends that USAID/Panama terminate the ATT project, or continue the project under an alternate mechanism such as an appropriately amended AID project.

Long-term technical assistance to the project should be expanded to include a third resident consultant. The presence of the expatriate technical assistance team has proven to be essential as the primary source of continuity of leadership for the project's implementation, as an immediately available source of technical expertise for conceptualizing the project's technology transfer program and developing and implementing the project's work plans, and as a continuing source of energy and commitment for pushing on a daily basis for steady progress in the project's development. Continuation of the long-term technical assistance component is particularly needed to ensure that the Panamanians returning from long-term training (12 in January 1988, and 17 in July 1989) will be effectively incorporated into the project. Further, the project should continue to provide short-term technical assistance but only where arrangements cannot be made for this assistance to be provided by IDIAP.

Beyond the specific issue of the GOP's commitment to meeting the counterpart funding obligation for the ATT project, the Team believes that there are four major problem areas in which institutional reform is needed within MIDA in order to resolve the problems and constraints that have plagued the ATT project. These areas are: (a) improved linkage of the ATT project with IDIAP's technology development function; (b) greater autonomy for the ATT project; (c) improved programming of extension personnel; and (d) improved program operations.

a. Improved Linkage of ATT Project with IDIAP's Technology Development Function

The Evaluation Team recommends that the ATT project place greater emphasis on linking the project's extension personnel with IDIAP's researchers. Improved collaboration between technology transfer (MIDA's ATT project) and technology development (IDIAP's ATD project) will increase Panama's capability to develop technology transfer programs for those commodities and technologies holding the greatest potential for increasing the farmer's productivity and income-earning capability. The project should facilitate the participation of MIDA's extension personnel and IDIAP's researchers in developing a collaborative program for carrying out on-farm adaptive research and the transfer of validated technologies to larger numbers of farmers and other clientele groups. The technology transfer component of these programs should be based on farmer-managed demonstration plots and other methods and media available for communicating information about improved technology to users.

The goal of such a joint program should be to ensure:

- (1) That the ATT project's extension personnel participate in the design, implementation, and evaluation of IDIAP's on-farm adaptive research program;
- (2) That IDIAP's researchers work closely with ATT project personnel in determining the technologies to be transferred to farmers and other clientele; and
- (3) That the project's personnel play an active role in providing feedback to IDIAP on field-level problems needing greater research attention.

The Team believes that the establishment of a more effective working relationship between IDIAP and the ATT project in MIDA has been impeded by a lack of consensus on the role which IDIAP should play in the ATT project and how this role should be financed. The Evaluation Team recommends that this is an issue which must be discussed and resolved by the appropriate parties within USAID/Panamá, MIDA, and IDIAP.

In the interim, the Team recommends that the ATT project should take immediate action to involve IDIAP's researchers in determining the technologies to be disseminated in the coming growing season. Further, the team recommends that the ATT project and IDIAP should begin to work together to develop a joint program of on-farm adaptive research trials. Finally, the Team recommends that the Director of IDIAP appoint a Liaison Officer who has the authority and responsibility to develop and coordinate mechanisms to link IDIAP's on-farm adaptive research program with the ATT project's program.

b. Greater Autonomy for the ATT Project

The Evaluation Team recommends that MIDA should provide the ATT project with greater autonomy for implementing project activities without political interference. Key problems that need to be addressed are:

- (1) Continued decentralization in program development and financial management is required. A special effort needs to be made to ensure that there is an even flow of resources to the project and that the project is given greater autonomy to allocate and manage these resources. The Evaluation Team recommends that USAID/Panamá and the GOP establish a mechanism that can be tapped by the project early in the year when the government does not have resources. Steps to implement this mechanism should be taken immediately to ensure that the project does not go through the first half of 1987 with the GOP again failing to meet its counterpart funding obligation. One possible mechanism would be to establish that unspent funds from the current year can be carried over to and used to cover expenses in the following year.
- (2) Faster turnaround time is needed in the processing of voucher reimbursements and purchase requisitions. The Team recommends that the ATT project be given autonomy to receive and spend budgeted funds.

c. Improved Programming of Extension Personnel

There are three personnel issues impeding implementation of the ATT project. First, there is a serious shortage of technical personnel to support the project; the original design provided for 24 technical specialists, while at present in Chiriquí, there are only five such specialists. The Evaluation Team recommends that the required personnel be provided to the project.

Second, there are few if any incentives in the ATT project for excellence in performance or to assume additional responsibility. The Team recommends that the personnel system be modified to provide performance incentives.

Third, the Evaluation Team understands that there are a number of persons charged to the project who have specialty areas (e.g., land reform) that are only marginally related to the project's objectives. Also, the Team heard reports of personnel charged to the project who actually work elsewhere in MIDA. The Evaluation Team recommends that USAID/Panama and MIDA carefully assess the current staffing pattern relative to actual project needs, and that appropriate adjustments be made to ensure that the project is not charged for unnecessary personnel.

d. Improved Programming of Extension Activities

First, involvement of the private sector (e.g., farmer organizations) in planning and evaluating a technology transfer program is essential. This has not been supported by administrators within MIDA. The Evaluation Team recommends that MIDA establish a firm policy for involving farmer groups and organizations in planning, implementing, and evaluating the ATT project.

Second, the changing market environment dictates that the ATT project work with farmers to identify market opportunities and requirements, and ensure a balanced program of demonstrations for technologies relevant to these market conditions. Adequate technical expertise in marketing and production economics is needed to assist farmers in evaluating market potentials and technologies for tapping these potentials. The Evaluation Team recommends that MIDA provide the ATT project with more marketing and production economics personnel to assist the project in developing its "market led" approach.

Third, the pace of adoption of technology by farmers can be accelerated through utilization of a balanced mix of extension methods. Mass media can play an important role in this but there have been delays in securing approval to implement radio programs in the project area. The Evaluation Team recommends that the ATT project continue developing mass media support to the project's technology transfer program.

The foregoing discussion focused on the immediate steps that need to be taken to improve the ATT project's performance and to further develop and test the project as a model for an operational agricultural technology transfer system. The Evaluation Team recommends that the GOP, in collaboration with USAID/Panama, establish a timetable according to which the GOP/MIDA will implement the needed institutional reforms in each of the four problem areas identified above.

To this end, the Team recommends that USAID/Panama should not approve the ATT project implementation plan for 1987 until the GOP/MIDA have established this essential timetable for institutional reform.

Further, the Team recommends that any faltering on the part of the GOP/MIDA in meeting the timetable's target dates for institutional reform should be interpreted by USAID/Panama as sufficient cause for appropriate action (e.g., not reimbursing vouchers until the reform in question has been implemented).

3. Implications for MIDA's Extension Service

The implementation of the preceding recommendations for the ATT project will require certain changes within the organization of MIDA at the national, regional, and Agency levels. However, beyond these changes, the Evaluation Team believes that the GOP and MIDA should seize this opportunity and begin to take the decisive action needed for implementing the full range of institutional reforms that will be required if MIDA is to be successful in developing as a depoliticized national agricultural extension service. Specifically, the Evaluation Team believes that MIDA needs to establish a depoliticized, technical thrust in which MIDA's national, regional, and Agency extension personnel are separated from those MIDA personnel having regulatory and other governmental functions. The possibility of establishing such a technical thrust in MIDA is considered by the Evaluation Team, along with several other options for linking the technology transfer function with IDIAP's technology transfer function.

SCOPE OF WORKBACKGROUND

The Agricultural Technology Development Project (525-0180) has been underway since September, 1979. The purpose of the project is to assist Panama through the Panamanian Agricultural Research Institute (IDIAP) to establish an agricultural research capability that will help small operators increase their land and labor productivity and ultimately their income and employment opportunities. Emphasis is given to adapting production technology that has already been generated in other parts of the world to Panama conditions. The strategic approach under the Project is to strengthen IDIAP's institutional capability and to focus research on eight geographic priority areas in the country.

Project implementation was evaluated in 1983 to identify and correct any technical, administrative or procedural problems which had arisen and impeded effective project implementation. Originally a five year, 7 million dollar project; it was extended by three and a half years and an additional 4.2 million dollars was added.

The Agricultural Technology Transfer Project (525-0227) is a 7 year, 7.5 million dollar effort initiated in 1982 and designed to establish a national agricultural transfer system in Panama through farm extension agencies. The Ministry of Agriculture Development (MIDA) extension program is aimed at providing small and medium farm operators in Chiriqui Province with a continuous flow of adapted agricultural technologies and improved practices. Two additional agencies outside the Chiriqui Province were later added to the project.

Technology transfer is carried out by MIDA through local extension agencies. These agencies, are under the executive control of MIDA's regional offices. MIDA has delegated the responsibility for project implementation to these regional offices. SENEAGRO is a normative institution, its function is to provide policy guidance and represent the extension service nationally within the MIDA structure. When evaluating the project the evaluation team is expected to follow the line of implementation responsibilities beginning at the agency level and continuing toward the national level.

ARTICLE I - TITLE

Panama Agriculture Technology Development and Transfer Evaluation

ARTICLE II - PURPOSE

To assess general project progress to date under the Agricultural Technology Development Project (525-0180) and the Agricultural Technology Transfer Project (525-0227) and their respective lead institutions (IDIAP, local extension agencies under the normative direction of SENEAGRO and the private sector), provide a strategic context for agricultural technology development and transfer within the Mission's agricultural strategy, and assess ways to assure an adequate supply over the long term of viable agronomic technology and the transfer of same to producers.

ARTICLE III - STATEMENT OF WORK

A) General Progress to Date.

For the Agricultural Technology Development Project (525-0180) the following tasks will be undertaken:

1. Implementation planning and execution of major project activities.
 - Identify and assess the achievement and continued relevance of the project goals and purposes.
 - Assess the performance in carrying out the project's planned area focused, production system research in selected geographic areas, complementary research and other grant funded research activities. Is the project focus still valid or are there other ways to appropriately conduct agricultural research in Panama?
 - Assess the effectiveness of inter-institutional communications/collaborations between IDIAP and other local research organizations as well as regional and international organizations.
2. Budget and Financial Analysis
 - Assess funding allocations and sustainability of the projects.
 - Assess the effectiveness and timeliness of the annual budgetary setting process and the relationship to meeting project needs.

- Analyze the necessary amounts of recurring costs that will be required to continue the activities after the project is terminated. Provide recommendations which will assure that the recurring costs are available.

3. Institutional Analysis

- Evaluate IDIAP's training program and overall staff development.
- Assess logistical support.
- Assess technical assistance received under the Project and determine future needs for same.

4. Policy

- Assess the process of developing institutional strategy objectives and priorities for IDIAP, and the appropriateness of these strategies and priorities to link extension and agricultural producers.
- Assess the relationship of the IDIAP to the rest of the agriculture sector, the board of directors, and interinstitutional relationships (national agricultural policies, laws, competitive advantage for Panama, commodity pricing and marketing).
- Assess the feasibility of greater interaction between IDIAP and the private sector, including increased IDIAP contracting with the private sector for services and the actual conduct of research.

For the Agricultural Technology Transfer Project (525-0227) the following tasks will be undertaken:

1. Implementation, planning and execution of major Project Activities.

- Identify and assess project achievements and continued relevance of project goals and purposes.
- Review project planning methods and budgetary process, including log frame and make recommendations on any needed modifications.
- Determine the major implementation issues facing the project. Evaluate counterpart funding, the financial management process, acquisition of supplies and equipment, centralization vs. decentralization of authority, personnel incentive programs, and other organizational issues.

- Assess how private and semi-autonomous institutions and other GOP institutions could participate to provide a more effective technology transfer process. Include consideration of cooperatives, producer associations, supplies associations, IDIAP and other organizations.
- Recommend changes in project implementation, management and organization to obtain project objectives based on institutional needs and strengths identified in this evaluation.
- Evaluate the technology transfer training program and overall staff development.
- Assess the technical assistance component of the project particularly the schedule and appropriateness of expected termination dates.
- Assess the process by which local Extension Agencies, MIDA's Regional Implementing Agencies, SENEAGRO and MIDA develop institutional strategy objectives and priorities.
- Analyze the approximate level of recurrent costs that will be required after project termination.

2. Project Extension and Research Questions

- As a strategy to increasing producers income, what is the potential of the technology transfer methods included in the current workplan? Taking into account each of the following components:
 - a. Area agencies staffed with extension workers.
 - b. The use of mass media to transfer technology.
 - c. The use of modern audio-visual tools in the motivation/adoption process.
 - d. The use of demonstration plots to motivate and train farmers.
 - e. The use of specific special projects.
- Determine how technology transfer should be linked to market considerations when selecting technologies to be promoted among farmers.

B) IDIAP's and local extension agencies, MIDA Regional Offices, SENEAGRO's long term viability and optimum contribution to Panama's agricultural development.

- Assess IDIAP's, the local extension agencies, MIDA Regional offices and SENEAGRO's desirable long term institutional strategy to achieve maximum continuous assured support and maximum impact on Panama's long term agricultural development.
- Outline definitive policy requirements in order for these institutions to achieve optimum goals.

C) Strategic context for IDIAP, local extension agencies, MIDA Regional Offices, SENEAGRO and the private sector within the Mission's agricultural strategy.

- Assess how IDIAP, local extension agencies, MIDA Regional Offices, SENEAGRO and the private sector might address the objectives of the new USAID agricultural strategy.
- Assess the crop, geographic, or other focus of IDIAP and local extension agencies, MIDA Regional Offices, SENEAGRO and how they contribute to achieving the Mission's strategic goals.
- Identify the areas of agricultural technology development and transfer within the Mission strategy that IDIAP, local extension agencies, MIDA Regional Offices and SENEAGRO have not effectively addressed.

ARTICLE IV - REPORTS

A draft summary of the major evaluation findings will be prepared covering those topics outlined in Article 3, and submitted to USAID, IDIAP and SENEAGRO (in English and Spanish) not less than two weeks prior to the completion of the work assignment. This will give USAID, IDIAP, and SENEAGRO sufficient time to review and comment on the draft so that any changes can be incorporated into the final report. The final AID report will be due in English and Spanish prior to the evaluation team's departure from Panama. The evaluation team will be expected to submit an English draft copy of the Project Evaluation Summary (PES) which contains recommendations for final adjustment in project design of each project prior to their departure. To finalize the AIT evaluation, the base line data from the current crop year will be required. This information will not be available until September and will be an insert to the final report.

Project Evaluation Team

Kerry Joseph Byrnes	RONCO Inc.*	Team Co-leader
John B. Claar	RONCO Inc.*	Ag Extension Specialist
Ulysses Jerry Grant	RONCO Inc.*	Ag Research Specialist
Jean C. Sussman	RONCO Inc.*	Team Co-leader
Robert Waugh	RONCO Inc.	Ag Education Specialist
Celso Carbonell	USAID/Panama	
Donald Drga	USAID/Panama	
Stella Patiffo	USAID/Panama	
Frank Pope	USAID/Panama	
Margaret Sarles	AID/Washington	
Paul Tuebner	USAID/Panama	
F. Rudolph Vigil	USAID/Panama	
Benigno Córdoba	SENEAGRO	
José Franceschi	SENEAGRO	
Otilia de Gálvez	SENEAGRO	
Campo Elias Herrera	SENEAGRO	
David Polo	SENEAGRO	
Humberto Tapia	SENEAGRO	
Juan Antonio Araúz	IDIAP	
Miguel Cuellar	IDIAP	
Sánchez Díez	IDIAP	
Hermel López	IDIAP	
Carlos Morán	IDIAP	
Arnoldo Muñoz	IDIAP	

*Curriculum Vitae attached.

JOHN B. CLaar, Senior Advisor, INTERPAKS (International Programs for Agricultural Knowledge Systems).

John (Jack) Claar, Senior Advisor, INTERPAKS of the University of Illinois, is a native of Watson, Illinois. He attended Blackburn College from 1940 to 1942, served in the U.S. Air Corps from 1943 to 1945, and graduated from the University of Illinois in 1947. He received a master's degree from the University of Illinois in 1948 and a Ph.D. degree in 1959. He is a member of Phi Kappa Phi, national honors fraternity and is listed in Who's Who in America and Who's Who in the World.

A recognized authority in the field of agricultural economics and farm management, Dr. Claar worked with the Sangamon Valley Farm Business Management Service from 1947 to 1951. He then became a member of the University of Illinois College of Agriculture staff as Farm Management Specialist and State Leader of Farm Business Farm Management Fieldmen. In 1955 he was named Chief of Farm Management Extension Branch of the Federal Extension Service in Washington and in 1958 was appointed Administrative Field Representative of the Federal Extension Service. He was Associate Director of Cooperative Extension in Illinois from 1960 to 1964 and served as Director from April 1965 to December 1979. In 1973 he was appointed Associate Vice President for Public Service for the University system involving all campuses and served in that capacity until he became Director of INTERPAKS from 1982-1985. During 1982-83 he served as Acting Dean of the College of Agriculture at the University of Illinois.

Dr. Claar has written extensively in both the field of farm management and of Extension administration. He has published articles in the Journal of Farm Economics, the Journal of Farm Managers and Rural Appraisers, and the Extension Service Review, and has written USDA and the University of Illinois publications. He has also been contributing author of two books: Goals and Values in Agricultural Policy, Iowa State Press, 1963; and The Cooperative Extension Service, Prentice-Hall, 1965.

Claar has served on the Adult Education Committee of the American Council of Education; the Galaxy Conference Committee of the Adult Education Organization; the University Council on Chicago Public Relations; and the University Council on Extension and Public Service. He is an ex-Chairman of the Extension Committee on Organization and Policy (a national policy body for the Cooperative Extension Service) and the Legislative Committee for Extension, and ex-Chairman of the Extension section of the National Association of State Universities and Land Grant Colleges. In Illinois he has served as the only non-cabinet member of the Governor's Rural Development Cabinet and on the State of Illinois Export Advisory Committee.

In 1976, Claar spent three months on administrative leave studying development in the Open University of Great Britain and a similar program in Germany in order to assess how a multi-media approach involving remote instruction could be used in adult education in the United States. At that time, he also took part in a conference on adult education in Tanzania as a representative of the United States Cooperative Extension Service. He has also served as a consultant on Extension Programs in Sierra Leone, Somalia, Zambia, India, Iran, the Caribbean, Indonesia, ~~Pakistan~~ ^{Yemen} and Egypt. In 1984, Claar represented the Dean of Agriculture in reviewing the development of Agricultural Research in Brazil and in signing a memorandum of understanding.

In his international work, Claar has had a special interest in assisting other countries with the design of Extension systems that, while embracing sound administrative principles, are uniquely tailored to the situation and well linked with sources of technology. In India and Sierra Leone, he recruited and assisted with the extension phase of comprehensive projects to develop "Land Grant type" institutions in those countries. This involved on-site consultations, as well as continual involvement and support over more than 10 years. In Iran, he served on a team to design a totally new College of Agriculture in an institution. In Somalia, Pakistan and the Caribbean, he worked on teams to design project papers for the U.S. Agency for International Development.

In Indonesia, Claar met with government officials and officials of a number of universities to lecture and consult on the development of community-service programs. In 1982, Claar served as Deputy Team Leader of a Presidential Mission to Egypt for six weeks. The work involved a study of the Agricultural sector, the potentials for increased output, the problems constraining more progress and recommendations for their solution. As Director of INTERPAKS he has provided leadership in establishing an interdisciplinary Center of International excellence involving technology generation and transfer. The program involves research, instruction, and technical assistance. As Senior Advisor in INTERPAKS, Claar concentrates on administration, organization and management of extension systems.

In 1983, INTERPAKS competed successfully for a collaborative research project funded by the U.S. Agency for International Development entitled "Technology Development, Transfer and Feedback Systems in Agriculture". Claar has written extensively in the publications issued by INTERPAKS and in 1984 initiated a Short Course for Administrators of International Extension Activities. He is a senior author, along with two others, of a publication aimed at the international community entitled: "The Cooperative Extension Service of the U.S.A.: An Adaptable Model". This publication strips the successful U.S. System down to the basic principles that have contributed significantly to its success, for consideration by other countries.

In 1983, Claar wrote (with Swanson), "The History and Development of Agricultural Extension" and (with Bentz) "Organizational Design and Extension Administration" in the Agricultural Extension Manual of the Food and Agriculture Organization. Also in 1983 (with Watts), he edited Knowledge Transfer in Developing Countries and wrote the lead article, "Knowledge Transfer for Agricultural Development". In 1985 Claar handled the extension section of a case study of extension and research in Malawi and took part in a research-extension linkage workshop in Zambia.

In 1975, he was a recipient of one of the recognitions supported by Dr. Wakefield through the Urbana-Champaign campus. The awards are given for high professional achievement in the individual's field or work.

In 1976, he received the Distinguished Service Award from the Illinois Agricultural Association (State Farm Bureau). This is given for outstanding contributions to agriculture and is the highest award bestowed by this organization which encompasses over 200,000 members in the state.

In 1980, he was recognized as the Educator of the Year by the Prok Producers of Illinois and was the first recipient of the Laura M. Weber Award of the Cooperative Extension Service in 1979. In 1982, the Alumni Association of the College of Agriculture awarded Dr. Claar their highest recognition, the Award of Merit. In 1983, he received the Distinguished Service Regional Award from the National Extension Fraternity, Epsilon Sigma Phi. He also received the 1985 Friend of Cooperatives Award from the Illinois Cooperative Coordinating Committees.

NAME: Ulysses Jerry Grant
DATE OF BIRTH: December 31, 1920
Rosedale, Oklahoma USA
ADDRESS: Home: 201 East Lakehurst Drive
Stillwater, Oklahoma 74074

Office: Office of International Programs
Room 221 - USDA Building North
Oklahoma State University
Stillwater, Oklahoma 74078

TELEPHONE: Home: (405) 624-9821

Office: (405) 624-6535

EDUCATIONAL EXPERIENCE:

B.S. Oklahoma State University, 1943
M.S. Oklahoma State University, 1948
PhD Cornell University, 1952

POSITIONS HELD:

1943-1946 U.S. Army - Honorable Discharge, Rank of Major - Infantry
1946-1952 Graduate Student
1952-1956 Geneticist (Corn Breeding)
The Rockefeller Foundation, Colombia
1957-1959 Assistant Director, Indian Agricultural Program, The Rockefeller Foundation, India
1959-1968 Director, Colombian Agricultural Program and the Rockefeller Foundation Representative in Colombia. Associate Director of Agricultural Sciences, The Rockefeller Foundation.
1968-1974 Director General of Centro Internacional de Agricultura Tropical (CIAT), on assignment from The Rockefeller Foundation. Kellogg Foundation Representative in Colombia, (Ad Hoc).
1975 Visiting Fellow in Plant Breeding and International Agriculture, Cornell University, Ithaca, New York

- 1976 On assignment from The Rockefeller Foundation to the International Agricultural Development Service, (IADS) as Representative for the United States and Europe.
- 1977-1980 On assignment from The Rockefeller Foundation to the International Agricultural Development Service (IADS) as Representative in Ecuador.
- 1981 Adjunct Professor of Agronomy and Program Officer International Programs, Oklahoma State University
- 1981 Retired from The Rockefeller Foundation, December 31.
- 1982-Present Adjunct Professor of Agronomy and Program Officer, International Programs, Oklahoma State University.

MEMBER OF ORGANIZATIONS AND CLUBS:

1. Asociacion Latino Americana de Fitotecnica (ALAF)
2. American Society of Agronomy
3. Sigma Xi
4. Phi Sigma
5. American Association for the Advancement of Science
6. Club Los Lagartos, Bogota, Colombia (to 1967)
7. Anglo American Club, Bogota, Colombia (to 1967)
8. Club Campestre, Cali, Colombia (to 1977)
9. Cosmos Club, Washington, D.C.

HONORS RECEIVED:

Outstanding Senior Military Student Award, R.O.T.C., Oklahoma State University. Silver Star, Bronze Star, Combat Infantry Badge, Two Battle Stars - European Theater, Presidential Unit Citation, French Silver Star, French Bronze Star.

Cruz de San Carlos - Highest award given to non-Colombian citizens. Presented by His Excellency, President Michael Pastrano Borrero (1972).

Medal of Merit - Colombian Institute of Agricultural and Animal Sciences (ICA) (1974).

Honorary Doctor's Degree (Doctor Honoris-Causa) in Agricultural Engineering, University of El Valle, Cali, Colombia (1974).

In 1977 I was invited by the Ecuadorian Government to participate in the Ministers of the Ecuadorian Government to participate in the Agricultural development in that country. The projects were oriented toward area development. Some progress was made toward the development of an "Ecuadorian Development Agency."

OTHER EXPERIENCE:

In 1976 I was assigned by The Rockefeller Foundation to the International Agricultural Development Service (IADS) as Representative for the United States and Europe. In this capacity I visited 40 universities in the United States and approximately 25 universities, institutes, foundations, and other agencies in Europe. The main purpose was to inform them of the aims and objectives of IADS and to encourage collaboration for the benefit of developing countries.

I contacted representatives of aid agencies in the United States, Britain, Germany, Switzerland, Sweden, Belgium, France, Holland, and Norway. In addition, frequent contacts were made with the Interamerican Development Bank, the World Bank, the W.K. Kellogg Foundation, the Kresge Foundation, and numerous private enterprise and church organizations.

I have taken part in many seminars and discussions as a guest speaker and as a panelist. These included a Plant Breeding Workshop of the National Council of Commercial Plant Breeders at Cornell University, January 20-22, 1976; the Conference of the Association of U.S. University Directors of International Agricultural Programs at Michigan State University, June 8-11, 1976; a Seminar at the Agricultural University of Norway on June 16, 1976, and World Food Conference of 1976 at Iowa State University, June 27-July 1, 1976.

While on terminal leave prior to retirement from The Rockefeller Foundation I was stationed at Oklahoma State University. Beginning the spring semester 1982, I have taught an agronomy course 4263, "International Agriculture and Food Production". The purpose of this course is to discuss problems of world food production and population increases in relation to adequate and nutritious food supplies.

In the spring of 1983 I organized a second course, Agronomy 5863, ~~Management of Agricultural Research Systems~~. This course discusses agricultural research in developed and developing countries and tries to view responsibilities from the political, administrative, managerial, and the researchers standpoints. It reviews agricultural research in a number of developed and developing countries and raises questions of training of personnel, continuity of appointments and other problems encountered such as financing, program priorities, and resource allocation.

These two courses have been taught each spring since 1982. In addition, I am on the advisory committee of a number of M.S. and PhD candidates.

Civic Award for meritorious service to the State of Valle Colombia.
Presented by the Mayor of Palmira, Colombia (1972).

Distinguished Agriculture Alumni Award from the Agriculture Student
Association of Oklahoma State University (1982).

MEMBER OF BOARDS:

Instituto Colombiano Agropecuario, (ICA) Bogota, Colombia, 1962-1967.

Universidad de Los Andes, Bogota, Colombia, 1966-1969.

Centro Internacional de Agricultura Tropical (CIAT), 1968-1974.

Agronomic Science Foundation, (American Society of Agronomy).

JOB EXPERIENCE:

While serving as Assistant Director of The Rockefeller Foundation Agricultural Programs in India, 1957-1959, I participated in the organization of the All-India Maize Improvement Scheme and served as Coordinator. Subsequently more than 70 commodity schemes were initiated in India, using the Corn Scheme as a model.

In 1959, I became Director of the Agricultural Program and Representative of The Rockefeller Foundation in Colombia. I helped organize the Instituto Colombiana Agropecuario; (Colombian Institute of Agriculture, ICA). Working together with the Director General, I served as Coordinator General of ICA. I also served on the Board of Directors of ICA. During 1962-1965, I helped ICA integrate into its program the technical assistance of eight international agencies including foundations, banks, and aid agencies. This five-year program included outside financial support of approximately \$28.5 million, in addition to substantial internal support. During that period, a large number of PhD and Master's candidates were trained at several U.S. universities. A graduate school with seven curricula at the Master's Degree level was formed in collaboration with the National University of Colombia.

In 1967 I was invited by the organizing committee of the Centro Internacional de Agricultura Tropical (CIAT) to become Acting Director. As Representative of The Rockefeller Foundation in Colombia, I worked with Colombian government officials to establish CIAT as a legal entity in Colombia.

In 1968, the Board of Trustees invited me to become Director General and a Trustee of CIAT. I held this position until November, 1974. This position involved negotiations with the Colombian Government for use of land, development of architectural plans for CIAT Headquarters, negotiations for funds with foundations and governments, hiring of senior staff of 13 nationalities, developing drainage and irrigation for the experiment station farm, organization of a customs clearance system and other administrative procedures. In addition, a local staff of approximately 900 technicians, secretaries, and workers was hired.

REAGAN'S AGRICULTURAL TASK FORCES:

President Reagan's "Caribbean Initiative" at Cancun, Mexico in 1981 has caused the leaders of a number of developing countries to request agricultural Task Forces to assist them in increasing agricultural production. I was invited to participate in Task Forces to Honduras in October 1982 and in the Ecuadorean Task Force in October 1984.

President of Honduras, Roberto Suazo Cordova asked for a review of the entire agricultural sector including forestry. As part of the overall charge I was asked to review the national agricultural research, extension and teaching programs including universities and ministries.

After I was invited to teach a short course in Spanish at the National University Faculty (CURLA). I was invited to Honduras for followup visits to review Task Force recommendations. In May 1984, I was invited to chair a seven man team which headed the "Honduran Agricultural Research Foundation". This organization subsequently has been assigned most of the responsibilities for agricultural research in Honduras.

In October 1984, a Task Force was invited to Ecuador by newly elected President Leon Febres Cordera to review that country's agricultural, forestry and fisheries sectors. Again, I was charged with the review of the agricultural research, extension and teaching programs country wide.

The main problem in Ecuador is lack of adequate support and training of highly trained staff. Ecuador needs U.S. support and help in upgrading their research extension and teaching programs. Perhaps requests will be forth coming for continuing support and help.

REFERENCES:

**Dr. Charles Browning
Dean, College of Agriculture
Oklahoma State University
Stillwater, Oklahoma 74078**

**Mr. William S. Abbott
Director, International Programs
Oklahoma State University
Stillwater, Oklahoma 74078**

**Dr. Paul Santelmann
Head, Department of Agronomy
Division of Agriculture
Oklahoma State University
Stillwater, Oklahoma 74078**

**Dr. John Pino
Senior Advisor
InterAmerican Development Bank
801 17th Street
Washington, D.C. 20006**

**Dr. Russell G. Mawby
Chairman Of The Board
The W.K. Kellogg Foundation
400 North Avenue
Battlecreek, Michigan 49016**

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"Rural Development for the Well-Being of the Community." Keynote Speech Inaugural Session, International Horticultural Science Meeting, Quito-Ecuador, August 29, 1977. (Delivered in Spanish and published in local newspaper.)

"Interaction of University, Agri-Business, and Government in the Development Process." Invitational speech at Inter-University Seminar, McPherson, Kansas, October 1, 1976.

"IADS and Its Development." U.S. Land-Grant College Association, International Directors' Meeting, Michigan State University, East Lansing, Mich., June 12, 1976.

"Agricultural Development in the Least Favored Nations: An Opportunity that Must be Realized." U.S. Land-Grant College Association, International Directors' Meeting, Michigan State University, East Lansing, Mich., June 11, 1976.

"IADS and Its Potential as an International Development Agency." Convocation at University of Norway, Aas, Norway, May 1976.

"Today's Agriculture and the Man on the Hill." Featured speaker, International Plastics Conference, Los Angeles, California, April 1976. (Cancelled because of move to Ecuador.)

"Private Enterprise and the World Food Problem." Guest speaker, Plant Breeding Workshop, Cornell University, Ithaca, N.Y., January 20, 1976.

Discussant of paper by Edwin B. Oyer, entitled "International Agricultural Research Institutes as Part of a Science and Technology System," Conference on Science and Technology Policy in the Developing Nations with Special Reference to the Industrial and Agricultural Sectors, Cornell University, Ithaca, N.Y., March 5, 1975.

During study-leave at Cornell University, gave approximately 30 hours of lectures and seminars to the following courses; Plant Breeding 503 and 516, International Labor Relations 671, and seminar course entitled STEPS (Scientific, Technological, Economic, Political, Sociological Steps to a Better Understanding of World Hunger). Also gave lectures to students from the Business School and other student groups who were interested in Inter-American Affairs.

1. Grant, U.J. 1948. The reaction of certain barley varieties to green-bug attack. M.S. Thesis. Oklahoma State University, Stillwater, Oklahoma.
2. Grant, U.J. 1952. A study of the inheritance of resistance to the corn leaf aphid (Aphis maidis, Fitch). PhD Dissertation. Cornell University, Ithaca, New York.
3. Grant, U.J. 1959. The past, present and future of maize breeding. Sci. Club J. 13(2):76-82. India.
4. Grant, U.J. 1976. Agricultural development in the least favored nations: an opportunity that must be realized. Paper given at the Conference of the Association of U.S. University Directors of International Agricultural Programs. Michigan State University, East Lansing, Mich.
5. Grant, U.J. 1976. Private enterprise and the world food problem. Paper given at the Plant Breeding Workshop, National Council of Commercial Plant Breeders. Cornell University, Ithaca, New York.
6. Grant, U.J. W.H. Hatheway, D.H. Timothy, C. Cassalet, and L.M. Roberts. 1963. Races of maize in Venezuela. National Academy of Sciences, National Research Council, Pub. 1136. Washington, D.C.
- 6a. Grant, U.J., W.H. Hatheway, D.H. Timothy, C. Cassalet, and L.M. Roberts. 1965. Razas de maiz en Venezuela. I.C.A. B. Tec. 10. (Translation of #6).
7. Grant, U.J. and B. Pena V. 1958. Valor de la seleccion visual en el mejoramiento del maiz. Reunion Interamer. de Fitogenet. Fitopatol. Ent. y Edafologos (Actas) 3:91-92.
8. Grant, U.J., R. Ramirez E., R. Astralaga R., C. Cassalet D., and M. Torregroza C. 1957. Como aumentar la produccion de maiz en Colombia. D.I.A. B. de Divulg. 1, 51p.
9. Grant, U.J., L.M. Roberts and D.L. Smith. 1958. Aspectos del programa de mejoramiento del maiz en Colombia. Reunion Interamer. de Fitogenet. Fitopatol. Ent. y Edafologos (Actas) 3:93-94.
10. Grant, U.J. and D.L. Smith. 1954. Collections of corn in the Andean region. Maize Genetics Cooperation News Letter 28:44.
11. Hingorani, M.K. and U.J. Grant. 1958. Erwinia carotovora f. sp. zeae, a destructive pathogen of maize in India. Indian Phytopath. 12(2): 151-157.

12. Ramirez, R.E., D.H. Timothy, E. Diaz B. and U.J. Grant in collaboration with G.E. Nicholson, E. Anderson, and W.L. Brown. 1960. Races of maize in Bolivia. National Academy of Sciences, National Research Council. Washington, D.C.
- 12a. Ramirez, R.E., D.H. Timothy, E. Diaz B., and U.J. Grant, in collaboration with G.E. Nicholson, E. Anderson, and W.L. Brown. 1961. Razas de maiz en Bolivia. D.I.A. B. Tec. 9, 157p. (Translation of #12).
13. Roberts, L.M., U.J. Grant, E. Chavarriaga M., and M. Torregroza C. 1958. Resultados preliminares sobre produccion de dos variedades sinteticas. Reunion Interamer. de Fitogenet. Fitopatol Ent. y Edafologos (Actas) 3:108-110.
14. Roberts, L.M. U.J. Grant, P.C. Mangelsdorf, and D.L. Smith. 1955. Classification of the races of maize in Colombia. Agron. Abstracts 47:55.
- 14a. Roberts, L.M., U.J. Grant, M. Torregroza, E. Yepes, C. Cassaletti, and D. Sarria V. 1955. Clasificacion de las razas de maiz en Colombia. Agr. Trop. 11:601-602. (Translation of #14).
15. Roberts, L.M., U.J. Grant, R. Ramirez E., W.H. Hatheway, and D.L. Smith in collaboration with P.C. Mangelsdorf. 1957. Races of maize in Colombia. National Academy of Sciences, National Research Council, Pub. 510. Washington, D.C.
- 15a. Roberts, L.M., U.J. Grant, R. Ramirez E., W.H. Hatheway, and D.L. Smith in collaboration with P.C. Mangelsdorf. 1957. Razas de maiz en Colombia. D.I.A. B. Tec. 2, 159p. (Translation of #15)
16. Roberts, L.M., U.J. Grant, M. Torregroza C., E. Yepes Y., C. Cassaletti, and D. Sarria V. 1958. Clasificacion de las razas de maiz en Colombia. Reunion Interamer. de Fitogenet. Fitopatol. Ent. y Edafologos (Actas) 3:107-108.
17. Timothy, D.H., W.H. Hatheway, U.J. Grant, M. Torregroza C., D. Sarria V., and D. Varela A. 1963. Races of maize in Ecuador. National Academy of Sciences, National Research Council, Pub. 975. Washington, D.C.
- 17a. Timothy, D.H. W.H. Hatheway, U.J. Grant, M. Torregroza C., D. Sarria V., and D. Varela A. 1963. Razas de maiz en Ecuador. I.C.A. B. Tec. 12. (Translation of #17).
18. Varela, D.A., U.J. Grant, and E. Yepes Y. 1958. Estudio comparativo sobre las caracteristicas de la mazorca en tres variedades de maiz de clima frio. Reunion Interamer. de Fitogenet. Fitopatol. Ent. y Edafologos (Actas) 3:113-114.
19. Yepes, E. and U.J. Grant. 1958. Ensayos comparativos sobre precocidad y rendimiento en Tibaitata. Reunion Interamer. de Fitogenet. Fitopatol. Ent. y Edafologos (Actas) 3:120-121.

NAME: Robert K. Waugh

KEY QUALIFICATIONS:

Dr. Waugh, private consultant, animal scientist, has 28 years of professional experience in international agriculture, principally but not exclusively, in Latin America. He was a resident in Latin America for 26 years starting first with the North Carolina Mission to Peru and then in 1957 with the Rockefeller Foundation.

He spent several years as head of the Dairy Cattle Program of ICA in Colombia while with the Rockefeller Foundation's program in that country. Later he was head of the Foundation's program in Colombia.

He is a founding member of CIAT.

He spent two years in the Planning Office of ICA in charge of educational planning where he also participated in the planning of some of ICA's rural development projects.

He was one of the chief architects of the Institute of Agricultural Science and Technology in Guatemala and then served six years as Adjunct Director of ICTA, guiding the new institute in programs which today are frequently referred to generically as farming systems research.

Responsibilities have included animal research, research management, institutional building, training, program design and development and evaluation.

Since retiring from the Rockefeller Foundation he has worked as a private consultant in several countries, and has also served as a Visiting Professor at the University of Florida where he has been a consultant on farm oriented research in North Florida, to the Florida Extension Service, to the Farming Systems Support Project for which the University of Florida has the leadership, and has also taught a course in Management of Farm Oriented Research and Extension.

EDUCATION: Ph. D., Animal Nutrition, Purdue University 1947

EXPERIENCE:

Consulting. Various consulting assignments while with the Rockefeller Foundation and more recently with several organizations, both public and private.

The Rockefeller Foundation 1953-1981. Animal Scientist, Assistant Director, Associate Director and Director of the Colombian Agricultural Program of the Foundation.

North Carolina State University. 1947-1957. Professor and Head of Dairy
Research and Teaching.

LANGUAGES: Mother Tongue-English
Others: Spanish

PERSONAL DATA:

Citizenship: USA
Publications: Several in English and Spanish

BRIEF SUMMARY OF ACTIVITIES OF R. K.

WAUGH

July 1981. Three weeks consultancy with ICTA, Guatemala. Have a report in manuscript state on 8 years of ICTA's experience. Agency, the Rockefeller Foundation.

September 18-November 20, 1981. Consultation and development of course (Spanish) for INIP, Mexico on dual-purpose cattle production in the humid tropics. Course was designed for 5 weeks duration. Agency, Winrock International.

October 1-2, 1981. Consultation and participation in review of Farming Systems Research and Development Guidelines, by CID at Tucson, Arizona. Agency, Colorado State University.

January 13-23, February 1-March 19, 1982 Consultation, University of Florida. Agency, University of Florida.

January 25-31, 1982. Leader of review team for evaluation of Rockefeller Foundation supported program, Instituto Tecnológico, Monterrey, Mexico. Agency, the Rockefeller Foundation.

March 22-April 3, 1982. Member team for review of AID program, Honduras. Agency, IADS

April 10-13, 1982. Lecturer in course (Spanish) on FSR/E given by the University of Florida to personnel of FONAIAP, Venezuela at Baramon, Venezuela. Agency, the University of Florida.

April 14-16, 1982. Consultation on private cattle project, Carora, Venezuela. Agency, IADS.

May 18-July 10, 1982. Consultation on local and international aspects of FSR/E and teaching of one credit hour course entitled Management of Farm Focused Research and Extension. Agency, the University of Florida.

July 30-August 14, 1982. Participation in management of seminar-workshop on Improved Seed for the Small Farmer. Paper presented, entitled La Semilla en la Transferencia de Tecnología al Pequeño Agricultor. Agency, CIAT.

August 23, 1982 and following weeks edit proceedings of the seminar-workshop mentioned above. Agency, CIAT.

September 5-11, 1982. Participation in a Workshop on the Design and Analysis of On-Farm Trials, sponsored by the University of Florida,

IICA and the USDA, San Jose, Costa Rica. Presented paper entitled The Role of On-Farm Research in Technology Generation. Agency, the University of Florida.

October 23-30, 1982. Delivered manuscript of proceedings of workshop on seed for small farmers to CIAT. Agency CIAT.

October 31-November 4, 1982. Consultation University of Florida on FSR/E. Agency, the University of Florida.

WORK LOG

R. K. WAUGH

December 8-11, 1982. Attended meeting sponsored by the University of Florida in Atlanta December 9-10, 1982, on the Farming Systems Support Project (FSSP). Chaired session (one and one-half days) on training and net-working as related to the FSSP.

December 27, 1982 to July 31 1983. Visiting Professor (Adjunct Research Scientist) University of Florida, International Programs in Agriculture, Institute of Food and Agriculture Science (IFAS).

January 27-February 1, 1983 Consultant to the Ministry of Malawi for reorganization of the Department of Agricultural Research.

April 12-April 28, 1983. Member of design team to develop a farming systems and development project with CARDI, to be supported by USAID.

May 18-June 20, 1983. Teaching course AGG 4932, Management of Farming Systems Research and Extension. University of Florida, Gainesville.

July 11-13, 1983. Attend Second Annual Seminar for Management Methods for International Development, Texas A & M University.

September 1, 1983. Briefing of Oregon State University team for Tanzania. Sponsor, University of Florida.

September 12, 1983. Consultation, Colorado State University on farming systems research training course for later in the month. Sponsor, University of Florida.

September 27-30, 1983. ISNAR/CIMMYT Workshop on organization and management of the farming systems approach for the generation of technology. The Hague. Sponsor, ISNAR/University of Florida.

October 10-14, 1983. CIAT seminars and commemoration. Sponsor, CIAT/University of Florida.

January 1- November 30, 1983. Core staff member to Farming Systems Support Project, University of Florida project leader.

January 1 - March 20, 1984 work on manuscripts and course preparation, residing at Steamboat Springs.

March 23 - April 7, 1984

Consultant to Honduran Agricultural Research Project of New Mexico State University and the government of Honduras. San Pedro Sula. Sponsor, New Mexico State University, Las Cruces.

May 7 - June 18, 1984. Teaching Course AGG 4932. Management of Farming Systems Research/Extension. Summer Session A. University of Florida. Sponsor, University of Florida, Gainesville.

May 14 - 16, 1984. Member Organizing Committee for the Fundacio'n Hondureña para la Investigacio'n Agri'cola. Sponsor Winrock International (AID).

JUNE 20 - JULY 11, 1984. Evaluation AID land reform project , Costa Rica --with J. Strasma. Sponsor University of Florida.

July 12 - July 27, 1984. Various at University of Florida.

September 1 - October 10, 1984. Participation in Domestic Farming Systems Conference. September 10-13. Various. University of Florida

October 10 - December 31, 1984. Several activities as staff, Colorado State University.

December 3 - 7, 1984. Honduras. Board meeting. Honduran Agricultural Research Foundation.)

January 1 thru May 1985. Visiting Professor University of Florida, Gainesville. Teaching course AEB 6634. Managing Agricultural Research and Extension for Development. On campus through May 1985. Arrangements thru Colorado State University and Farming Systems Support Project.

August 6 - September 18, 1985. Consulting assignment to the Ministry of Agriculture (Recursos Naturales), Honduras on re-organization of agricultural research and Extension. With WINROCK INTL.

October 27 - November 18, 1985. Consulting in Colombia with private organization for purpose of helping define development program for agriculture.

February 22 - March 1, 1986 Consulting with Fundacion Hondurena de Investgation Agricola (Honduran Foundation for Agricultural Research, La Lima, Honduras) and attending meeting of General Assembly as member of the Vigilance Committee.

APRIL 1 - MAY 14, 1986. Member mid-term evaluation team for the Drylands Agriculture Applied Research Project, Morocco. Contractor

for project: Midwest International Agricultural Consortium, with lead institution the University of Nebraska. Contract or for evaluation: Kinrock International Institute for Agricultural Development.

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CURRICULUM VITAE
(current as of May 15, 1986)

Name: Kerry Joseph Byrnes

Residence Address:

Professional Interests:

Application of the principles and practices of social and behavioral science to the planning, design, organization, conduct, administration, and evaluation of agricultural training/education, production, and technology development and transfer projects. Have interest, experience, and competence in farmer organizations, technology transfer to small farmers, applied research with farmer participation, production input marketing, organization and conduct of rural studies and surveys, data analysis, and use of simulations in training.

Personal Data:

Nationality: U.S.A.
Marital Status: Married / 1 child

Language Proficiency:

English (native)
Spanish (fluent)
French (beginning level)

Education (photocopies of transcripts available on request):

Ph.D.	1975	Iowa State University--Sociology (major) and Economics (minor)
M.A.	1968	Michigan State University--Communication
B.A.	1967	Michigan State University--Sociology
	1966	Univ. of the Philippines, College of Agriculture (1 semester)
	1964	Autonomous Univ. of the State of Mexico (1 summer)

Honors / Honor Societies:

Phi Kappa Phi
Gamma Sigma Delta (Agriculture)
Alpha Kappa Delta (Sociology)

Other Training:

Technical Report Writing, 1982
Leader Effectiveness Training, 1981
Eagle Scout, Boy Scouts of America

Membership in Professional Societies:

Rural Sociological Society

Employment Record: Currently working as a free lance.

09/30/85-05/08/86	Short Term Consultant, Communication for Technology Transfer in Agriculture (CTTA) Project, Academy for Educational Development, Washington, D.C.
11/01/84-09/29/85	Agricultural Institutions Analyst, Development of Agricultural Institutions Project, International Programs, Graduate School, USDA, Washington, D.C.
05/79 - 10/31/84	Sociologist, Outreach Division, International Fertilizer Development Center, Muscle Shoals, Alabama.
08/75 - 04/79	Sociologist, Agro-Economic Division, International Fertilizer Development Center, Muscle Shoals, Alabama.

Employment Record (continued)

- 02/72 - 08/75 Research Associate, Indicators of Social Development Project, Dept. of Sociology & Anthropology, Iowa State University, Ames, Iowa.
- 07/70 - 02/72 VISTA Volunteer, Miami, Florida.
- 09/69 - 06/70 Research Assistant, Dept. of Sociology & Anthropology, Iowa State University, Ames, Iowa.
- 09/68 - 08/69 Research Aide, Proyecto Integrado de Mercadeo Urbano Rural, Cali, Colombia; employer: Dept. of Agricultural Economics, Michigan State University, East Lansing, Michigan.

Short Term Assignments in Developing Countries (09/75 - present):

Latin America

- 1977 Brazil Reconnaissance visit to assess potential for collaborative study on fertilizer adoption/demand.
- 1977 Dominican Republic Same.
- 1978 Guatemala Review Rockefeller Foundation postdoctoral study on fertilizer use decisionmaking of Altiplano farmers.
- 1979 Dominican Republic Review progress of geographer's study of fertilizer marketing to small farmers; and explore potential for collaboration of D.R. institutions in IFDC projects.
- 1979 Colombia Assist in data collection for phosphate fertilizer market study.
- 1984 Colombia Conduct Effective Management Communication course & Green Revolution Game in I Curso Avanzado Sobre Administracion de Empresas de Semillas y Mercadeo, CIAT.
- 1985 Peru 4 visits to assist AID/ST/RD & USAID/Peru in design, implementation, & coordination of an agricultural input marketing assessment conducted by a team of of expatriate consultants & Peruvian counterparts.
- 1985 Honduras Assist Academy for Educational Development write the implementation plan for the Communication for Technology Transfer in Agriculture (CTTA) Project.
- 1986 Honduras Conduct a socioeconomic study of citrus growers for Fundacion Hondurena de Investigacion Agricola (FHIA).
- 1986 Ecuador Review consultant's analysis of USAID/Ecuador Private Sector Coffee Renovation Project; & assess potential for linkage of CTTA Project with USAID/E projects involving farmer organizations & technology transfer.

Asia

- 1976 Indonesia, Malaysia, & Bangladesh Visit governmental and university research institutions to assess potential for collaborative studies on fertilizer adoption.
- 1979 Bangladesh Conduct study of equity impact of fertilizer use for USAID/B Fertilizer Distribution Improvement Project.
- 1980 Philippines Visit sites of FAO trials of sulphur-coated urea and interview farmer collaborators.
- 1981 Thailand Fertilizer Marketing Training Program for the Asian Region (Alpha simulation leader, lecturer).
- 1982 Indonesia Fertilizer Marketing Training Program for the Asian Region (program manager, Alpha simulation leader, Green Revolution Game manager, program lecturer).
- 1983 Bangladesh Fertilizer Marketing Management Training Program for BADC (program coordinator, Alpha simulation leader, lecturer, Green Revolution Game manager).
- 1983 Pakistan FAO/NFDC Fertilizer Marketing Management Training Program (Alpha simulation leader).
- 1983 Indonesia Alpha Fertilizer Marketing Simulation Training Program (conducted 1-week training program).
- 1983 Philippines Fertilizer Marketing Training Program for the Asian Region (pre-program planning with program cosponsor).

Africa

- 1980 Kenya Fertilizer Use Efficiency Training Program for the African Region (assistant program manager, lecturer).
- 1981 Upper Volta Meet with SAFGRAD and IITA FSR program staff to explore potential for collaborative research with IFDC on farmer use of phosphate rock.
- 1981 Mali Develop proposal for socioeconomic research component of farm-level trials of phosphate rock.
- 1981 Senegal Meet with WAARDA researchers conducting farm-level trials of sulphur-coated urea on rice and review status of survey of farmer preference for SCU as compared with urea.
- 1982 Nigeria Fertilizer Marketing Training Program for the African Region (lecturer and case study discussion leader).
- 1983 Mali Supervise coding and preparation of draft report on socioeconomic survey of farmers who participated in trials of phosphate rock.

Publications and Papers (copies of nonpublished papers available on request):

"Using Farmer Organizations to Support Communication for Technology Transfer in Agriculture," prepared for the Academy for Educational Development, 1986.

"A Characterization Study of Orange Growers in the El Progreso Region of Honduras," prepared for Fundacion hondurena de Investigacion Agricola, 1986.

"The Potential Role of Farmer Organizations in Increasing the Productivity and Income-Earning Capability of Small-Farmer Agricultural Systems in the Developing Countries: A Concept Paper," prepared for the Agency for International Development, 1985.

"Determining the Malian Farmer's Evaluation of an Indigenous Phosphate Source: Preliminary Findings from a Survey of Farmers Participating in SAFGRAD's Tilemsi Phosphate Rock Trials," prepared for IFDC, 1983.

"Diffusion and Adoption of Innovations in Fertilizer-Related Agricultural Production Technology in Developing Countries," prepared for IFDC, 1981.

"Content..., Criterion..., and Construct Validation: Alternative Approaches to Validity Assessment of the Guttman-Type Scale of Community Differentiation," Comparative Rural and Regional Studies, Occasional Paper 2: Research on Rural Structure, May 1980.

"A Social Action Perspective on Small Farmer Agricultural Development," presented at V World Congress for Rural Sociology, Mexico City, August 1980.

"Impact of a Training Program on Participants' Mastery of Fertilizer-Related Subject Matter: An Evaluation of a Fertilizer Marketing and Distribution Course," presented at Annual Meetings of the Rural Sociological Society, 1979.

"A Preliminary Study of the Equity Impact of Fertilizer Use in Bangladesh" (coauthored with Gene T. Harris), prepared for USAID/Bangladesh Fertilizer Distribution Improvement Project, 1979.

A Methodology for Indicators of Social Development: The Small Farmer Agricultural Sector (coauthored with Jaleh Shadi-Talab), Sociology Report 127 (Supplementary Report 3), December 1976. Third author on three other research reports prepared under the Indicators of Social Development Project.

A Construct of Social Action for Small Farmer Agricultural Development, unpublished Ph.D. dissertation, Iowa State University, 1975; a sociological analysis of the technology transfer model employed in the Puebla Project.

"Agricultural Extension and Education in Developing Countries" (coauthored with Francis C. Byrnes), pp. 326-351 in Raanan Weitz (ed.), Rural Development in a Changing World, M.I.T. Press, 1971.

Sistemas de Informacion y Comunicacion de Mercadeo en la Zona de Influencia de Cali, Informe Technico #9, Proyecto de Mercadeo Integrado Urbano Rural, Cali, Colombia, 1969.

The Relationship of Dogmatism to Channel Preference and Learning in Classroom Communication, unpublished M.A. thesis, Michigan State University, 1968.

Supplementary Statement of Professional Background of Kerry J. Byrnes Relevant to Employment in Development-Related Work

1. I have a solid academic foundation in the social sciences, having taken courses in sociology, communication, economics, anthropology, social psychology, psychology, research methods, and statistics. I hold a Ph.D. in sociology, with a minor in economics from Iowa State University, and an M.A. in communication from Michigan State University. I've also had first-hand experience with classroom educational problems in the developing countries, having taken some of my undergraduate courses while enrolled as a university student in Mexico (1964) and the Philippines (1966).

2. During the 9+ years that I was employed with the International Fertilizer Development Center (IFDC), I worked in research and training on a multidisciplinary basis with soil scientists, agronomists, agricultural economists, and market development, training, and agricultural education specialists. This past collaborative work is indicative of my ability to work effectively as a member of a multidisciplinary team.

3. Through personal study and my IFDC work experience I developed a working knowledge of agriculture in the developing countries and, more specifically, a basic understanding of plant, soil, and nutrient factors and relationships affecting crop growth in tropical agriculture. During the last 5 years that I worked with IFDC, I assisted in the development of numerous fertilizer efficiency research, training, and workshop activities involving the following countries: Colombia, Bangladesh, Indonesia, Philippines, Kenya, Mali, and Senegal. I also worked with IFDC colleagues on the development of a "Fertilizer Efficiency Research and Technology Transfer" (FERATT) Workshop for directors of agricultural research, extension, and fertilizer marketing organizations in the developing countries.

4. I have written and conducted studies on the problems and processes involved in developing improved agricultural technology and transferring this technology to small farmers in the developing countries. My dissertation, a case study of the Puebla Project in Mexico, conceptualized a systems model of an action strategy for technology development and transfer programs aimed at small farmer agriculture. I also co-authored a published article on the problems involved in validating an agricultural technology as improved and appropriate within the resource constraints and agro-socioeconomic environment of the small farmer.

5. While employed in IFDC's Agro-Economic Division, I prepared a literature review of geographic, economics, sociological, and communication studies of the factors influencing adoption and diffusion of innovations in fertilizer-related agricultural production technology. While preparing this review, I began to follow the growing body of literature on farming systems research and the role of the social sciences in agricultural research, extension, and marketing. I developed a research proposal for a Rockefeller Foundation-funded postdoctoral fellowship for a rural sociologist to serve as a member of an IFDC team conducting research to determine the potential for using directly applied ground phosphate rock as a phosphate nutrient source for small farmer agriculture in Colombia.

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6. While employed in IFDC's Outreach Division, I worked closely with technical specialists on the development of IFDC's marketing and fertilizer use efficiency group training programs as well as various socioeconomic components included in these programs. I gained experience and skills useful in preparing for and managing training programs and other group programs (e.g., seminars, workshops, and conferences). Relevant skills include: defining program objectives; scheduling program content, activities, and resource persons; writing program announcement brochures; handling program-related communications (e.g., telexes and letters); coordinating local arrangements; and supervising support staff. I developed an evaluation system for IFDC's group training programs. This system was favorably reviewed by the UNDP, the major funding agency for IFDC's training programs.

7. I have previous field experience working in the developing countries on both long-term and short-term assignments. I worked for a year (1968-69) with Michigan State University on a USAID-funded study of the agricultural marketing system in the Cauca Valley of Colombia. While employed with IFDC, I participated in numerous short-term research or training assignments, ranging in duration from two weeks to two months, in the following countries: Brazil, Colombia, Dominican Republic, Bangladesh, Indonesia, Pakistan, Philippines, Thailand, Kenya, Mali, Nigeria, and Senegal. While working with the Agricultural Support Institutions Division of AID's Office of Rural and Institutional Development, I participated in four TDY assignments to Peru to assist in the design and implementation of an assessment of agricultural input marketing in that country.

8. During the period of my employment with IFDC, I also provided leadership in developing IFDC's capabilities in the use of training simulations such as IFDC's "Alpha Fertilizer Marketing Simulation" (which focuses on marketing decisionmaking) and the "Green Revolution Game" (which focuses on farm management decisionmaking). At the time I left IFDC I was exploring the potential for IFDC's training programs of other simulations such as "POLYSIM" (which focuses on policy decisionmaking) and "Change Agent" (which focuses on the decisionmaking of change agents seeking to promote adoption of recommended agricultural technology by farmers). I also developed a prospectus, budget, and program schedule for a proposed IFDC training program titled "Socioeconomic Factors in Fertilizer Use Development" (SEFFUD), in which the above-mentioned simulations would be used to help stimulate increased participant awareness, knowledge, and understanding of the broad range of organizations and individuals--from policymakers to small farmers--involved in decisionmaking affecting the development of fertilizer use in a country.

9. While working with the Agricultural Support Institutions Division of AID's Office of Rural and Institutional Development, my work focused on the role of farmer organizations and input supply systems in facilitating technology transfer. I wrote a concept paper outlining an analytical framework for applied research on the role of cooperatives and other types of farmer organizations in increasing the productivity and income-earning capability of small farmer agriculture in the developing countries.

10. I am fluent in Spanish. I am currently studying French using autotutorial cassettes. My typing speed is approximately 90-100 wpm. I have acquired some basic skills in using word processing programs on various computers including the Wang; the Apple IIe, Epson QX-10, and Compaq microcomputers, and the portable Hewlett Packard.

JEAN C. SUSSMAN

Department of Agricultural and Applied Economics
332 Classroom Office Building
University of Minnesota
St. Paul, Minnesota 55108
Telephone: (612) 625-7014

PROFESSIONAL STRENGTHS

Extensive professional experience and training in economic and social development. Excellent analytical and conceptual capability in economics and statistics. Ability to integrate economic theory with applied work, and to integrate economics with other social sciences. Experience with policy and demand analysis, finance, and cost benefit analysis. Proficient with micro and main frame computers.

Ability to write well, and to complete short and long term projects. Articulate speaker. Able to work with diverse groups of individuals.

Survey design and implementation in the United States and Latin America.

PROFESSIONAL EXPERIENCE

January 1986 -

Research Associate, Department of Agricultural and Applied Economics, University of Minnesota, St. Paul, Mn. Accomplishments: Project on agricultural technology dissemination in Cuba. Work includes paper for publication, presentations and travel to international institutions involved in agricultural research. Funded by grant from Rockefeller Foundation.

April 1984 - December 1984 and August 1985 - December 1985

Associate, MAC, Inc. Member of World Bank Structural Adjustment Loan team in Panama. Accomplishments: Recommended and implemented changes in public sector agricultural institutions. Developed pilot project for agricultural collectives, and economic and financial evaluations of state owned enterprises. Prepared written reports for the World Bank and Government of Panama. Supervised two employees (counter-parts) from the Ministry of Agricultural Development.

March 1985 - August 1985 (part-time)

Administrative Fellow, Agricultural Extension Service, University of Minnesota, St. Paul, Mn. Accomplishments: Developed financial, farm and stress management resources for farm families. Worked with Extension staff, farm families and state and local government.

September 1977 - December 1983 (part-time)

Research Assistant, Department of Agricultural and Applied Economics, University of Minnesota, St. Paul, Mn. Accomplishments: Research on changes in the agricultural labor force and in part-time farming. Wrote papers and compiled background work for dissertation and published article in Minnesota Agricultural Economist. Supervised two part-time employees.

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Professional experience, cont.March 1977 - September 1977

Associate, Pan American Development Foundation (Organization of American States), Washington, D.C. Accomplishments: Completed proposal for O.A.S. on small business development along both sides of Mexican-American border. Research, proposal writing and fund raising.

June 1976 - October 1976 (part-time)

Research Assistant, Institute of Latin American Studies, University of Texas, Austin, Tx. Accomplishments: Wrote paper on Colombian government's participation in industrial development. Researched joint business ventures between multi-national firms and Latin American governments.

October 1973 - August 1975

Assistant to the Manager of Migrant Services, Michigan Department of Social Services, Lansing, Mi. Accomplishments: Developed migrant program for Michigan Department of Social Services. Supervised and trained 100 seasonal employees. Liason with Governor's Office and Agricultural Extension Service.

EDUCATION

Ph.D. - Agricultural and Applied Economics. University of Minnesota, St. Paul, Minnesota, 1985. Emphasis on production economics, economic development and consumption economics.

M.A. - Latin American Studies. Institute of Latin American Studies, University of Texas, Austin, Texas, 1977. Emphasis on economics, sociology and anthropology.

A.B. - Latin American Studies. Residential College, University of Michigan, Ann Arbor, Michigan, 1973. Emphasis on history.

LANGUAGES

Spanish: Completely fluent.
 French: Good reading, speaking and writing abilities.
 Portuguese: Good reading, fair speaking and writing abilities.

AWARDS

Rockefeller Foundation Grant (1985).
 National Defense Fellowship (1975-76).

PUBLICATIONS

Production Differences between Part-Time and Full-Time Agricultural Operations in Dodge County, Minnesota (dissertation, July 1985).

The State of the Agrarian Reform Asentamiento in Panama, with Thomas Schweigert, Randy Stringer and William Thiesenhusen (September 1984).

"A Profile of Part-Time Farming," Minnesota Agricultural Economist, No. 638. (October 1982).

**Agricultural Technology Development
Logical Framework**

**Agricultural Technology Transfer
Logical Framework**

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

RESTRICTIONS: THIS IS AN OPTIONAL FORM WHICH CAN BE USED AS AN ADD TO SUPPLEMENTARY DATA FOR THE PDR REPORT. IT NEED NOT BE RETURNED OR SUBMITTED.

Life of Project:
From FY 77 to FY 84
Total U.S. Funding: \$2,000,000
Date Prepared: DEC 17 1979

Project Title & Number: AGRICULTURAL TECHNOLOGY DEVELOPMENT

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p><u>Sector Goal</u></p> <p>To improve distribution of the benefits of the agricultural development process.</p>	<p>Measures of Goal Achievement:</p> <p>Small farmer incomes increase by 9% per year.</p>	<p>Final Project Evaluation (data from baseline and follow-up diagnostic studies)</p> <p>Other census and survey data.</p>	<p>Assumptions for achieving goal targets:</p> <p>Increased production is not offset by lower prices.</p> <p>Panama's small farmer adopt technologies.</p>
<p><u>Program Goal</u></p> <p>To develop agricultural technologies which are appropriate for Panama's small farmers.</p>	<p>Adoption of new or modified technologies by 30% or more of Panama's small farmers who are exposed to them.</p>	<p>Final Project Evaluation (data from baseline and follow-up diagnostic studies)</p>	

and related to the
development of

**PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

Life of Project:
From FY 79 to FY 84
Total U.S. Funding \$7,000,000
Date Prepared: _____

Project Title & Number: _____

PAGE 2

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Project Purpose</p> <ol style="list-style-type: none">1. To initiate or expand production systems research activities in eight priority areas.2. To enhance IDIAP's capability to carry out agricultural research on a continuing basis.	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <ol style="list-style-type: none">1. Production systems research being conducted in eight areas.2. IDIAP begins research in at least two additional areas.3. Trained personnel are producing production systems recommendations.	<ol style="list-style-type: none">1. Project files <p>IDIAP records</p> <p>IDIAP records, publications</p>	<p>Assumptions for achieving purposes:</p> <ol style="list-style-type: none">1. GSF continues to support agricultural research activities

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AND NUMBER OF THE
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project
From FY 73 to FY 84
Total U.S. Funding \$7,000,000
Date Prepared _____

Project Title & Number: Ag Tech Dev - 575-0180

PAGE 3

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs	Magnitude of Outputs		Assumptions for achieving outputs
I. Research Activities A. Area Focused Research 1. Area diagnostic studies completed. 2. Field experiments conducted 3. Recommendations for specific technological modifications.	Year 1 2 3 4 5 10 8 10 10 10 10 10 <i>studies</i> 200 465 730 995 1250 2520 <i>field experiment</i> 0 0 10 20 30 60 <i>recommendations</i>	IDIAP records IDIAP records IDIAP records project files	1. Research process yield specific recommendations for improved technologies 2. Small farmers are willing to collaborate in on-farm experiments.
B. Complementary Research Activities 1. IPM Program a. Data on pesticide usage compiled and analyzed b. IPM materials adapted c. IPM plan d. Establishment of IPM laboratory e. Implementation of an IPM educational program	Report containing data and analysis for 8 project areas 1 package IPM materials in Spanish Laboratory staffed and equipped Trained personnel disseminating IPM materials.	Project files Project files Inspection Inspection	
2. Research Grants	Year 1 2 3 4 5 0 3 9 15 20	IDIAP records Project Files	

**PROJECT DESIGN SUMMARY
 LOGICAL FRAMEWORK**

Life of Project:
 From FY 79 to FY 84
 Total U.S. Funding \$7,000,000
 Date Prepared _____

Project Title & Number: _____

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS										
<p>Outputs</p> <p>II. Institutional Development</p> <ol style="list-style-type: none"> 1. An expanded research staff of sufficient size to carry out a large scale research program. 2. An adequately trained professional research staff capable of implementing an area-focused production systems research program. 3. An adequately equipped central headquarters facility operating in Santiago. 	<p>Magnitude of Outputs</p> <p>Professional and technical staff size.</p> <table border="1"> <tr> <td>Year 1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>56</td> <td>60</td> <td>77</td> <td>88</td> <td>95</td> </tr> </table> <p>Provision of long-term training for 35 administrative, technical and scientific personnel and 500 person-months of short-term training. (See training schedule)</p> <p>Production systems research being carried out in four areas by year one (end) and in eight areas by year three.</p> <p>Central headquarters built and fully equipped. (See implementation plan for construction and equipment schedules).</p>	Year 1	2	3	4	5	56	60	77	88	95	<p>IDIAF personnel records</p> <p>Project records</p> <p>Project records</p>	<p>Assumptions for achieving outputs</p> <ol style="list-style-type: none"> 1. IDIAF can locate and hire sufficient professional and technical personnel to meet program requirements
Year 1	2	3	4	5									
56	60	77	88	95									

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AND 100-20 (2-74)
SUPPLEMENT 1

**PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

Life of Project: _____
From FY 79 to FY 84
Total U.S. Funding \$7,400,000
Date Prepared: _____

Project Title & Number: _____

PAGE 4

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS																																						
<p>Inputs</p> <table border="0"> <tr> <td>1. Personnel</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2. Commodities</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3. Training</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4. Technical Assistance</td> <td></td> <td></td> <td></td> </tr> <tr> <td>5. Construction</td> <td></td> <td></td> <td></td> </tr> <tr> <td>6. Other Costs</td> <td></td> <td></td> <td></td> </tr> </table>	1. Personnel				2. Commodities				3. Training				4. Technical Assistance				5. Construction				6. Other Costs				<p>Implementation Target (Type and Quantity) Magnitude of Inputs</p> <table border="0"> <tr> <td>AIR</td> <td>GOP</td> </tr> <tr> <td></td> <td>4336</td> </tr> <tr> <td>2341</td> <td>744</td> </tr> <tr> <td>1315</td> <td>100</td> </tr> <tr> <td>1510</td> <td></td> </tr> <tr> <td>1334</td> <td>1250</td> </tr> <tr> <td>500</td> <td>700</td> </tr> </table>	AIR	GOP		4336	2341	744	1315	100	1510		1334	1250	500	700	<p>1. Review of IDIAP's personnel and fiscal records and of project documentation.</p>	<p>Assumptions for providing inputs</p> <p>1. IDIAP's budgetary requests are substantially filled.</p> <p>2. Program implementation will occur in accordance with planning and budget projections.</p>
1. Personnel																																									
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10

AGRICULTURAL TECHNOLOGY TRANSFER
PROJECT DESIGN SUMMARY: LOGICAL FRAMEWORK MATRIX

Annex I.A.
Page 1 of 5 pages

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS																																																		
A. Sector Goal																																																					
To increase Panama's food production and increase employment opportunities in agriculture while conserving the natural resource base	Yearly increases in food production of at least 4% after the fourth year.	Census & national statistics	1. Lower prices do not offset gains in agricultural sector's productivity.																																																		
B. Project Purpose																																																					
To establish an operational agricultural technology transfer system in the Province of Chiriquí.	A system in place capable of delivering new technologies to 60% of small/medium producers in Chiriquí on a yearly basis by 1985, with an adoption rate of 60%.	Annual Project Reviews Project evaluations AID Project Files GDP statistics	1. New technologies are made available throughout the life of the Project by IDIAP, UP, Int'l Agricultural Research Centers and others.																																																		
1.1 <u>Delivery of Technologies</u>		MIMA records and files.																																																			
1.1.1 <u>By Technicians</u>		AID Project files.	2. C.F.s relating to field services met on a timely basis.																																																		
	<table border="1"> <thead> <tr> <th>Type: Direct</th> <th>1983</th> <th>1984</th> <th>1985</th> <th>1986</th> <th>1987</th> <th>1988</th> <th>1989</th> <th>Totals</th> </tr> </thead> <tbody> <tr> <td>Demonstrations</td> <td>-</td> <td>200</td> <td>450</td> <td>450</td> <td>450</td> <td>450</td> <td>450</td> <td>2,450</td> </tr> <tr> <td>Farm Visits</td> <td>8,550</td> <td>25,662</td> <td>51,324</td> <td>51,324</td> <td>51,324</td> <td>51,324</td> <td>51,324</td> <td>291,832</td> </tr> <tr> <td>Field Days</td> <td>-</td> <td>110</td> <td>110</td> <td>110</td> <td>110</td> <td>110</td> <td>110</td> <td>660</td> </tr> <tr> <td>Farmer Meetings</td> <td>220</td> <td>220</td> <td>220</td> <td>220</td> <td>220</td> <td>220</td> <td>220</td> <td>1,560</td> </tr> </tbody> </table>	Type: Direct	1983	1984	1985	1986	1987	1988	1989	Totals	Demonstrations	-	200	450	450	450	450	450	2,450	Farm Visits	8,550	25,662	51,324	51,324	51,324	51,324	51,324	291,832	Field Days	-	110	110	110	110	110	110	660	Farmer Meetings	220	220	220	220	220	220	220	1,560							
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1.1.2 <u>By Specialists</u>																																																					
	<table border="1"> <thead> <tr> <th>Type: Direct</th> <th>1983</th> <th>1984</th> <th>1985</th> <th>1986</th> <th>1987</th> <th>1988</th> <th>1989</th> <th>Totals</th> </tr> </thead> <tbody> <tr> <td>Seminar/Wrkshps</td> <td>16</td> <td>16</td> <td>18</td> <td>24</td> <td>40</td> <td>48</td> <td>48</td> <td>210</td> </tr> <tr> <td>Field Visits</td> <td>100</td> <td>120</td> <td>120</td> <td>144</td> <td>240</td> <td>240</td> <td>240</td> <td>1,204</td> </tr> <tr> <td>Field Days</td> <td>-</td> <td>8</td> <td>10</td> <td>12</td> <td>24</td> <td>24</td> <td>24</td> <td>102</td> </tr> <tr> <td>Farmer Meetings</td> <td>-</td> <td>16</td> <td>18</td> <td>24</td> <td>40</td> <td>48</td> <td>48</td> <td>194</td> </tr> </tbody> </table>	Type: Direct	1983	1984	1985	1986	1987	1988	1989	Totals	Seminar/Wrkshps	16	16	18	24	40	48	48	210	Field Visits	100	120	120	144	240	240	240	1,204	Field Days	-	8	10	12	24	24	24	102	Farmer Meetings	-	16	18	24	40	48	48	194							
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Farmer Meetings	-	16	18	24	40	48	48	194																																													
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Other media	12	12	12	12	12	12	12	84																																													

10/11/83

NARRATIVE SUMMARY	OBJECTIVES/ VERIFIABLE INDICATORS	MEANS OF VERIFICATION	DISCOUNT ASSUMPTIONS																																																							
C. Project Outputs																																																										
1.0 Human Resources Development A staff of trained technology transfer technicians and administrators of sufficient size to extend new technologies to small/medium farmers throughout Chiriqui Province.	1.1 Trained Personnel	1. MIDA records and files. 2. AID Project files. 3. Field Inspections. 4. Project Evaluations	1. Persons trained under the project begin work on a timely basis, are located where needed and work in the subject areas in which they were trained.																																																							
	1.1.1 Pre-Program Training (1 month)																																																									
	<table border="1"> <thead> <tr> <th>Position</th> <th>83</th> <th>84</th> <th>85</th> <th>86</th> <th>87</th> <th>88</th> <th>89</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Ing. Agron.</td> <td>27</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>27</td> </tr> <tr> <td>Assistants</td> <td>109</td> <td>25</td> <td>25</td> <td>25</td> <td>25</td> <td>25</td> <td>25</td> <td>259</td> </tr> <tr> <td>Specialists</td> <td>24</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>24</td> </tr> <tr> <td>Support Staff</td> <td>12</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>12</td> </tr> <tr> <td>Yearly Totals</td> <td>172</td> <td>25</td> <td>25</td> <td>25</td> <td>25</td> <td>25</td> <td>25</td> <td>322</td> </tr> </tbody> </table>	Position	83	84	85	86	87	88	89	Total	Ing. Agron.	27	-	-	-	-	-	-	27	Assistants	109	25	25	25	25	25	25	259	Specialists	24	-	-	-	-	-	-	24	Support Staff	12	-	-	-	-	-	-	12	Yearly Totals	172	25	25	25	25	25	25	322			
Position	83	84	85	86	87	88	89	Total																																																		
Ing. Agron.	27	-	-	-	-	-	-	27																																																		
Assistants	109	25	25	25	25	25	25	259																																																		
Specialists	24	-	-	-	-	-	-	24																																																		
Support Staff	12	-	-	-	-	-	-	12																																																		
Yearly Totals	172	25	25	25	25	25	25	322																																																		
	1.1.2 Initial Technical Training																																																									
	<table border="1"> <thead> <tr> <th>Position</th> <th>83</th> <th>84</th> <th>85</th> <th>86</th> <th>87</th> <th>88</th> <th>89</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Ing. Agron.</td> <td>27</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>27</td> </tr> <tr> <td>Assistants</td> <td>109</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>109</td> </tr> <tr> <td>Specialists</td> <td>24</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>24</td> </tr> <tr> <td>Yearly Totals</td> <td>160</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>160</td> </tr> </tbody> </table>	Position	83	84	85	86	87	88	89	Total	Ing. Agron.	27	-	-	-	-	-	-	27	Assistants	109	-	-	-	-	-	-	109	Specialists	24	-	-	-	-	-	-	24	Yearly Totals	160	0	0	0	0	0	0	160												
Position	83	84	85	86	87	88	89	Total																																																		
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	1.1.4 Short Courses (3-6 months)																																																									
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<p>3.1 Information, Education & Communication</p> <p>A regional agricultural IF&C center capable of reproducing and delivering on a timely basis adapted technology transfer research results and other useful information developed by IDIAP, MIDA, Faculty of Agronomy, or adapted from other sources outside of Panama.</p>	<p>3.1 An ID&C Center located in David capable of producing technology transfer materials in the following quantities:</p> <p>3.1.1 I, E & C Outputs</p> <table border="1"> <thead> <tr> <th>New Materials</th> <th>83</th> <th>84</th> <th>85</th> <th>86</th> <th>87</th> <th>88</th> <th>89</th> <th>Totals</th> </tr> </thead> <tbody> <tr> <td>a. Handouts</td> <td>10</td> <td>24</td> <td>28</td> <td>36</td> <td>100</td> <td>100</td> <td>100</td> <td>398</td> </tr> <tr> <td>b. Pamphlets</td> <td>-</td> <td>20</td> <td>50</td> <td>60</td> <td>100</td> <td>100</td> <td>100</td> <td>430</td> </tr> <tr> <td>c. Technical notes</td> <td>-</td> <td>24</td> <td>25</td> <td>60</td> <td>100</td> <td>100</td> <td>100</td> <td>409</td> </tr> <tr> <td>d. News releases</td> <td>15</td> <td>40</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>555</td> </tr> <tr> <td>e. Circular letters</td> <td>10</td> <td>26</td> <td>50</td> <td>50</td> <td>50</td> <td>50</td> <td>50</td> <td>286</td> </tr> <tr> <td>f. Planting guide</td> <td>-</td> <td>12</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>62</td> </tr> <tr> <td>g. Tech-Packs</td> <td>-</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>60</td> </tr> <tr> <td>h. Video-Cassettes</td> <td>-</td> <td>6</td> <td>6</td> <td>6</td> <td>10</td> <td>10</td> <td>10</td> <td>48</td> </tr> <tr> <td>i. Graphic designs</td> <td>-</td> <td>50</td> <td>50</td> <td>50</td> <td>50</td> <td>50</td> <td>50</td> <td>300</td> </tr> <tr> <td>j. Slide-Tapes</td> <td>-</td> <td>12</td> <td>12</td> <td>12</td> <td>12</td> <td>12</td> <td>12</td> <td>66</td> </tr> <tr> <td>k. Other</td> <td>-</td> <td>12</td> <td>12</td> <td>12</td> <td>12</td> <td>12</td> <td>12</td> <td>72</td> </tr> </tbody> </table>	New Materials	83	84	85	86	87	88	89	Totals	a. Handouts	10	24	28	36	100	100	100	398	b. Pamphlets	-	20	50	60	100	100	100	430	c. Technical notes	-	24	25	60	100	100	100	409	d. News releases	15	40	100	100	100	100	100	555	e. Circular letters	10	26	50	50	50	50	50	286	f. Planting guide	-	12	10	10	10	10	10	62	g. Tech-Packs	-	10	10	10	10	10	10	60	h. Video-Cassettes	-	6	6	6	10	10	10	48	i. Graphic designs	-	50	50	50	50	50	50	300	j. Slide-Tapes	-	12	12	12	12	12	12	66	k. Other	-	12	12	12	12	12	12	72	<p>1. Annual Project Review</p> <p>2. I, E & C files</p> <p>3. Local agencies' records</p>	<p>1. IDIAP, VP and International Agricultural Research Centers will provide constant flow of technological changes of applicability in Chiriqui.</p> <p>2. Extension agents and assistants will hold regularly scheduled farm visits, field days, farmer meetings and cultivate demonstration plots giving validity to improved practices and methods transferable to other areas.</p>
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<p>4.1 Logistical Support</p> <p>A logistical support system capable of supporting all technology transfer activities in Chiriqui.</p>	<p>4.1.1</p> <table border="1"> <thead> <tr> <th></th> <th>83</th> <th>84</th> <th>85</th> <th>86</th> <th>87</th> <th>88</th> <th>89</th> </tr> </thead> <tbody> <tr> <td>a. Personnel reassigned/recruited</td> <td>160</td> <td>25</td> <td>25</td> <td>25</td> <td>25</td> <td>25</td> <td>25</td> </tr> <tr> <td>b. Vehicles purchased</td> <td>13</td> <td>138</td> <td>-</td> <td>-</td> <td>2</td> <td>3</td> <td>-</td> </tr> <tr> <td>c. Vehicles maintained</td> <td>-</td> <td>-</td> <td>-</td> <td>151</td> <td>153</td> <td>156</td> <td>156</td> </tr> <tr> <td>d. Equipment and materials purchased</td> <td>\$</td> <td>\$</td> <td>\$</td> <td>\$</td> <td>\$</td> <td>\$</td> <td>\$</td> </tr> <tr> <td>e. Construction contracts</td> <td>6</td> <td>5</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>f. New logistical management systems and controls</td> <td>1</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table> <p>1/ During LOP, vehicles will be maintained through warranty and a private maintenance contract.</p>		83	84	85	86	87	88	89	a. Personnel reassigned/recruited	160	25	25	25	25	25	25	b. Vehicles purchased	13	138	-	-	2	3	-	c. Vehicles maintained	-	-	-	151	153	156	156	d. Equipment and materials purchased	\$	\$	\$	\$	\$	\$	\$	e. Construction contracts	6	5	-	-	-	-	-	f. New logistical management systems and controls	1	-	-	-	-	-	-	<p>1. Review of Deputy Project Coordinators and USAID Project Manager Records.</p> <p>2. MIDA/IDIAP reimbursement requests.</p>	<p>1. It is assumed that MIDA personnel will be reassigned to or recruited for the project as needed, that counterpart funding is forthcoming for equipment and materials, and that COP's procurement performance is improved by technical assistance.</p>																																																				
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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	EFFICIENT ADOPTIONS
<p>5.0 Institutional Coordination</p> <p>Institutional mechanisms set up capable of generating private sector feedback and coordinating activities of MIDA Region 1 with IDIAP and other members of SPA.</p>	<p>5.1 Formal Memo of Understanding signed between MIDA and IDIAP by January 1, 1983.</p> <p>5.2 Other agreements executed (BDA, ISA, Facultad de Agronomía, et al.) as required.</p> <p>5.3 Comité Agropecuario Regional de Transferencia de Tecnología operational and coordinating project activities within the sector and with complementary activities of other Ministries.</p> <p>5.4 Ten (10) Local Coordinating Committees established and providing continuous feedback to MIDA, IDIAP and other SPA representatives on the project and its implementation (CALs to meet at least 3 times a year)</p> <p>5.5 A minimum of 7 conferences sponsored by OCA have been held on the subject of technology transfer throughout the life of the project.</p>	<p>1. Copies of agreements/memos.</p> <p>1. Copies of agreements/memos.</p> <p>1. Formal Enabling Documents 2. Committee Minutes.</p> <p>1. Formal enabling documents. 2. Committee Minutes.</p> <p>1. Conference proceedings and reports.</p>	

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS		MEANS OF VERIFICATION							IMPORTANT ASSUMPTIONS	
D. <u>Inputs</u>	(\$000)									1. GOP Reimbursement Requests. 2. AID Controller reports. 3. AID Project Files.	1. Conditions Precedent are met as scheduled in the Pro Ag.
1.0 <u>Human Resources Development</u>			<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>Totals</u>	2. Technical Assistance Contracts let on a timely basis.
1.1 Short Term Technical Assistance	5 p/m	41	-	-	-	-	-	-	-	41	3. Inputs are available and in place on a timely basis.
1.2 Training	2,498 p/m	752	915	833	531	323	219	219	219	3,792	4. Prices do not rise significantly beyond what has been allowed for contingencies.
Total		-	-	-	-	-	-	-	-	3,833	5. GOP counterpart funds are available on a yearly basis as required by Project implementation plans.
2.0 <u>Infrastructure</u>			<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>Totals</u>	6. GOP presents reimbursement requests on a continuous, timely basis in order to keep the rotating fund functioning properly.
2.1 Construction	11 buildings	600	575	-	-	-	-	-	-	1,175	
3.0 <u>IF&C</u>			<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>Totals</u>	
3.1 Short Term Technical Assistance	5 p/m	21	21	-	-	-	-	-	-	42	
3.2 Equipment/Materials	various	30	45	15	15	15	15	15	15	150	
Totals		-	-	-	-	-	-	-	-	192	
4.0 <u>Logistical Support</u>			<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>Totals</u>	
4.1 Short Term Technical Assistance	5 p/m	-	41	-	-	-	-	-	-	41	
4.2 Vehicles	156	195	870	-	-	30	45	-	-	1,140	
4.3 Equipment/Materials	various	167	141	20	104	20	20	20	20	502	
4.4 Field inputs/materials	various	-	15	20	20	20	20	20	20	115	
Totals		-	-	-	-	-	-	-	-	1,798	
5.0 <u>Institutional Coordination</u>			<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>Totals</u>	
5.1 Short Term Technical Assistance	5 p/m	21	21	-	-	-	-	-	-	- 42	
5.2 Conferences	7	25	25	25	25	25	25	25	25	175	
5.3 Viáticos	various	8	8	10	10	10	10	10	10	66	
Totals		-	-	-	-	-	-	-	-	283	
6.0 <u>Evaluations</u>			<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>Totals</u>	
6.1 Short Term Technical Assistance	25 p/m	-	123	-	-	-	-	-	70	219	
Total AID Loan Funded	\$6,000										
Total AID Grant Funded	1,500										
Total GOP Counterpart	6,340										
TOTAL PROJECT	13,840										

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