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DATE SENT JULY 29, 1977

FROM - ROCAP/Guatemala

SUBJECT - Project Evaluation: 596-0066, Transfer of Technology

REFERENCE -
FOR: MO/PAV

PROJECT EVALUATION SUMMARY

1. Mission or AID/W Office Name ROCAP	2. Project Number 596-0066

3. Project Title
Transfer of Technology

4. Key Project Dates (fiscal years)

a. Project Agreement Signed	b. Final Obligation	c. Final input delivered
FY 1976	FY 1979	FY 1980

5. Total U.S. funding - life of project
$720,000

6. Evaluation Number 77-4	7. Period covered by this evaluation From: 6/76 Month/Year To: 3/77 Month/Year

8. Date of this Evaluation Review
April, 1977
Month/Year

9. Action Decisions Reached at Evaluation Review:	10. Officer or Unit responsible for follow-up	11. Date action to be completed
See Part 5, Recommendations, pages 30-37 in attached evaluation report.	-	-

Attachment: Evaluation Report

PAGE 1 OF 2 PAGES

DRAFTED BY	OFFICE	PHONE NO.	DATE	APPROVED BY
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AID-5 (10-71) (Do not type below this line) PRINTED

12. SUMMARY - See Part 1, Summary Evaluation, page 1 in attached report.

13. EVALUATION METHODOLOGY - This is the first of three evaluations scheduled during the first 18 months of the project (Phase I -- operational feasibility study). Subsequent Phase I evaluations are scheduled for September, 1977 and April/May, 1978. This evaluation was conducted in accordance with previous project planning. For further information, see Part 2, Methodology, page 1.

14. DOCUMENTS TO BE REVISED TO REFLECT DECISIONS NOTED ON PAGE 1:

None

BOSTER

PROJECT APPRAISAL REPORT

Country: ROCAP - Central America Regional

Cooperating Institution: Instituto Centroamericano de Investigación y Tecnología Industrial - ICAITI

Serial Number: 77-4

Project: Transfer of Technology, 596-0066

Initial FY of Obligations : FY 1976

Final FY of Obligations : Phase I, FY 1977; Phase II, FY 1979

Total AID Funds Programmed: $720,000 (Phase I, $310,000)

Total AID Funds Obligated : $220,000

Total ICAITI Contribution Planned: $317,000 (Phase I, $137,000)

Evaluator, ICAITI : Mario Santos

Evaluator, ROCAP : Henry Braddock

PROJECT EVALUATION

TRANSFER OF TECHNOLOGY
(596-0066)

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E. Report on Identification of Priority Industrial Sectors
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1. Summary Evaluation

This first project evaluation finds that the project, despite a slow start and delays in several scheduled project activities, is essentially on track and is picking up momentum toward the achievement of project objectives. The whole project was delayed some three months in getting under way and the initiation of the 18-month feasibility study (Phase I) was adjusted to November, 1976. The time required to recruit and train appropriate personnel to serve as field representatives took longer than planned. However, all three representatives are now employed. Two are on station while one is undergoing training in the United States. With all three field representatives actively establishing contacts with industrial firms and generating demand for project services, the project should quickly achieve the pace necessary to provide the project experience for which Phase I was designed. The original relationships established between ICAITI and various contractors for technical assistance have evolved to the point where a redefinition of relationships and services required needs to be articulated. The project also can profitably use technical support beyond that originally envisioned, and arrangements for such support are being worked out. The limited number of clients developed by the field representatives for project services to date tentatively suggests substantial latent demand for such technology transfer assistance in the Central American industrial sector. The project has established a basic reporting and recording system which will permit continuous monitoring of this demand as well as the project's capacity to satisfy it. Based on the growing experience of the field representatives and other project participants, and given the quickening pace of project development, it should be possible for subsequent evaluations to ascertain definitively the feasibility of the technology transfer concept as employed in this project.

2. Methodology

This evaluation was conducted by Mario Santos of ICAITI and Henry Braddock of ROCAP in Guatemala during the period

March 14-25, 1977. Principal contributors to the evaluation included ICAITI's Deputy Director, the ICAITI project supervisor, the ROCAP project manager, ICAITI's project field representatives, and the members of ICAITI's Project Committee. In addition to interviews of these key personnel, the evaluators reviewed project documentation, plans, reports, contracts, correspondence, and accounting records.

3. Project History

a) Origins

At the February, 1974 Conference of Foreign Ministers in Mexico, the United States agreed to incorporate science and technology as a discussion point in a "New Dialogue" with Latin America. To follow through on this initiative, a "Working Group on Science and Transfer of Technology" convened in June, 1974, in Brasilia. That group established four sub-groups to address the following issues:

I. Strengthening national scientific and technological systems.

II. Potential assistance from the more developed countries.

III. Technology transfer.

IV. Creation of institutional mechanisms.

Subgroup II, whose agenda and working materials were prepared by ICAITI, met in Guatemala in September, 1974. Shortly after that meeting, representatives from ROCAP and ICAITI met to discuss concepts of the transfer of technology. ICAITI then prepared a paper on the subject, and, in subsequent discussions ICAITI and ROCAP explored the possibility of ICAITI undertaking a technology transfer project.

In May, 1975, ROCAP undertook with ICAITI to begin development of a project paper. AID/TAB/OST, Denver Research

Institute (DRI), and the Consortium for the Development of Technology (CODOT) assisted in the preparation of a draft paper. Professor Albert Rubenstein of Northwestern University, a recognized expert in the field of technology transfer, recommended that an operational study be undertaken to determine the feasibility of the proposed technology transfer system in Central America. Consultants from DRI and the Illinois Institute of Technology, Research Institute (IITRI) assisted in producing the final project paper which was forwarded to AID/W in April, 1976. The DAEC accepted the concept of an operational feasibility study and, in May of 1976, approved implementation of Phase I (18 months), subsequent approval of Phase II (an additional 18 months) to be contingent upon the findings of the feasibility study as proposed in the project paper. Phase I AID funding of $310,000 was approved.

b) Development

1) AID Funding. Project Agreement 76-9 between ICAITI and ROCAP was executed in May, 1976, obligating $100,000 of AID monies to permit ICAITI to contract technical assistance for project design and evaluation and to hire and train field representatives. Under this agreement project implementation orders were issued in July authorizing ICAITI to contract the services of DRI (PIO/T 60017), IITRI (60019), and DRI's James Blackledge (60018). Contracts were subsequently let by ICAITI to Blackledge and DRI (in August and September, respectively). The contract with IITRI has not yet been negotiated to the satisfaction of all parties (see Section 4.C.2). A second project agreement (ROC.T.Q.#7) in September, 1976, provided an additional $120,000 of AID funding which was sub-obligated in March, 1977, to procure technological backstopping services from DRI (PIO/T T.Q.#7) and Georgia Tech (PIO/T T.Q.#6), and commodities to facilitate information retrieval (PIO/C T.Q.#8). This funding also provided continued support for ICAITI field and staff personnel as well as further training.

c) Activity Summary

The project began to move forward in August, 1976, receiving its initial impetus from a general planning meeting held at ICAITI and attended by representatives from DRI and IITRI in addition to ROCAP. The one-week session produced a preliminary design for project implementation and evaluation as well as a revised Project Evaluation and Reporting Technique (PERT) plan. In September a DRI representative spent a week with ICAITI to develop a plan for identifying the priority industrial sectors to be addressed by the project. (A report on identification of these sectors is at Attachment E).

ICAITI contacted local industrial organizations in El Salvador and Costa Rica to solicit office space for the project field representatives. Two of these were contracted on schedule and underwent three weeks of training in October/November in the United States and Canada. ICAITI added to its staff an industrial engineer (not project funded) to handle retrieval and processing of technical information.

After completion of their initial orientation and training, the two field representatives began working in El Salvador (also covering Nicaragua) and Guatemala (also covering Honduras). ICAITI's project supervisor participated in a two-week orientation program on information systems and services in the United States. Shortly thereafter, a DRI representative spent a week in Guatemala assisting ICAITI with information system design. In January a third field representative was added to the project team and received an initial orientation at ICAITI before taking up his station in Costa Rica. In February the project concept and plan was presented to, and received the general endorsement of, the Central American Ministers of Economy at their meeting in Managua. ICAITI completed preparation and production of a brochure to be used by the field representatives in their contacts with potential project clients, and the representatives began to initiate demands on ICAITI for services to be provided clients

already identified. In March the ICAITI project staff participated in a one-week seminar on evaluation of information systems conducted under OAS auspices in Guatemala, and the first of three evaluations scheduled for Phase I of the project was conducted.

4. Review and Assessment

a) Introduction

This section reviews the project's status in the light of the Project Paper, project agreements to date, and related documents, and examines the activities of various direct and indirect participants in the project.

b) Plans and Documentation

1. Project Paper. A review of the Project Paper at this distance in time indicates that project planners had a sound conceptual grasp of the technology transfer process. As the Project Paper notes and reiterates, revisions and refinements to the Paper (especially to the Logical Framework and its indicators of achievement) were expected in the course of implementation. In approving the project, the DAEC called for a new or revised Project Paper prior to proceeding with Phase II. This evaluation reinforces the need for such revision for which ample information should be available upon completion of Phase I. The main purpose of a revised Project Paper should be to provide more relevant and specific outputs expected and indicators for achievement of those outputs. In general we find the project to have moved in the direction outlined in the Project Paper albeit at a somewhat slower initial pace than envisioned. The whole project was delayed some three months in getting under way (the starting date for the 18-months feasibility study was adjusted to November, 1976); the field staff was not fully assembled until January, 1977, when the third field representative (for Costa Rica) was brought aboard; and there were some delays in subobligating available AID funds (Transition Quarter monies were not

subobligated until the second quarter of FY 1977). Nevertheless, these hurdles have been crossed, the project is developing momentum and accomplishing the tasks laid out in project planning, and we see no reason why the remaining period of Phase I (to be completed in April, 1978) should not offer sufficient time to gain the experience necessary to permit a valid assessment of feasibility by the end of that period.

2. Project Agreements. ICAITI and ROCAP have discharged their respective obligations in accordance with the provisions of the project agreements (76-9 and T.Q. #7), although, as noted above, there have been slippages in the time table. From a programming standpoint, subobligation of funds should not be delayed as was the case with Transition Quarter funding. Project managers should strive for timely obligations even though ROCAP documentation may require subsequent amending (indeed, such flexibility is to be encouraged in the project's pilot phase and should be assumed).

As part of this evaluation the ROCAP and ICAITI Controllers reviewed the project financial accounting records maintained by ICAITI. The accounting was found to be basically satisfactory. A report on that review is found at Attachment D. At Attachment C is a detailed commentary on accomplishment of specific activities scheduled in the PERT. A draft of a revised PERT was reviewed by the evaluators. While a revision is appropriate at this time, we found the draft document to need additional refinement by the responsible ROCAP and ICAITI officers, and this report makes such a recommendation.

3. General Comments. This project aims at testing the feasibility of extending ICAITI's outreach through field representatives who will provide a dynamic dimension to the technology transfer process, bringing ICAITI closer to actual and potential clients, while establishing systematic procedures for acquisition of needed information and assistance from outside the region.

The procedure which has been developed begins with a contact, normally at the initiative of the field representative but occasionally at that of the client. The field representative then prepares a contact report which he forwards to ICAITI's PTT office, retaining a copy for his files (when appropriate, the contact report may be preceded by a telephone call or cable to expedite the response). The report includes any request for services be it for information, equipment, technical assistance, or some combination of these. If the request can be satisfied locally, this is noted along with the action agent.

Upon receipt, the PTT office either files the report for record or, if services are requested, assigns action to the appropriate ICAITI division. If that division can provide the service, it so notes with an estimate of time required for project completion. If not, it specifies and undertakes other necessary actions (such as soliciting information or other assistance from outside sources).

Once a requested service has been provided to a client, the contact report is completed with an entry describing the action taken and a notation indicating whether or not it satisfied the requirement. Most simple information requests are handled by the field representatives, but other ICAITI technicians may be employed in the delivery of more complex assistance. Occasionally this process is initiated by a client directly contacting an ICAITI technical division. In such cases the procedure is the same except that the relevant division initiates the contact report with a copy to the appropriate field representative (who may then assume responsibility for further contacts and service delivery depending on the project).

PTT does not represent a radically new activity for ICAITI. ICAITI has considered technology transfer within its charter and has denoted it as a principal organizational activity for some time. The unique element of PTT is the extended outreach capacity provided by the field representatives. PTT also extends, and targets, ICAITI's reach toward

outside agencies which can provide needed technological information and assistance. And PTT provides a sharper marketing and management focus on technology transfer within ICAITI. Thus the project can add substantially to ICAITI's capacities.

ICAITI has established, over the years, a wide range of contacts outside Central America and has through them, as necessary, gained access to needed technological assistance. So long as ICAITI is operating in industrial sectors with which it is familiar (and in which its professional staff is skilled), it should encounter no significant problems in gaining access to needed information, technology, and technical assistance. But in extending PTT services to other sectors (to all sectors ultimately) it will have to establish new contacts for the technological assistance to service new demands. Identifying appropriate sources, establishing new access arrangements, and determining cost effectiveness are complicated by the increasingly large number of information systems and agencies offering assistance in the technology field. The approach of umbrella contracts with a variety of backstopping agencies for specific services as required is a well-considered arrangement at this stage.

The flexibility to continuously modify the project during the feasibility stage is of the first importance as is the associated freedom for trial and error experimentation to yield the experience upon which to base such modifications. Getting into arrangements which tie up available funds (viz: the proposed long-term, fixed-price contract between ICAITI and IITRI) quickly reduces or eliminates this needed flexibility and is to be avoided as much as possible. There should be no stinting on travel, telephone, and other forms of communication and negotiation vis-a-vis other uses of available funds. During the first six months of the project, the second largest expenditure item supported such costs (after salary costs of the field representatives). This pattern should be continued. In this regard, the purchase of commodities should be minimized during Phase I. The planned procurement of technical handbooks and information

retrieval equipment is within the scope of, and supportive of, PTT objectives, but any further such acquisitions should be reviewed skeptically in light of the limited funding available during the feasibility study.

ICAITI is accounting for PTT costs incurred by its various divisions and those costs are ascribed to the project, thus accurately reflecting and recording project costs. This procedure provides incentives to ICAITI's professional staff to respond to PTT requirements. It also fosters the integration of the PTT effort with the full ICAITI organization and its whole range of activities.

At the same time, in recent years ICAITI has not always retrieved the full costs of services rendered, even within the terms of its own accounting. This may derive, at least in part, from the difficulties of precisely estimating the costs of services later rendered under fixed-fee contracts. PTT has not yet come fully to grips with this question. At the outset some services arranged through the field representatives were offered free of charge. More recently the representatives have been charging for services based on ICAITI's accounting of costs or, in some cases, negotiating for a percentage of costs depending on the user's ability to pay. This evaluation suggests the advisability of ICAITI's undertaking a review of its pricing policies including considerations of costs, prices, and value. The latter attribute of a technology transfer deserves special attention insofar as a specific technology may have a value to the user substantially in excess of ICAITI's acquisition and transfer costs. The field representatives are beginning to get a feeling for this as they extend their negotiating experience with clients.

Perhaps because of the location of its physical facilities in Guatemala, ICAITI has traditionally provided the bulk of its services to public and private entities in that country (and the Government of Guatemala has been a more substantial contributor to ICAITI than the other governments in the region). In fact, the number of ICAITI clients

has varied in direct ratio to their distance from Guatemala so that Costa Rica, the furtherest removed, has been the least serviced among the Central American countries (the field representative from Costa Rica noted that, contrary to the experience of his colleague in Guatemala, his first requirement in establishing contacts was not to introduce the PTT but to introduce ICAITI). The advent of the field representatives can do much to help ICAITI become a more fully regional organization in providing technical services more equally to all Central American countries.

At the same time, ICAITI has taken pains in the PTT not to cast itself as "competitor" with other entities in Central America but rather to shape a role as "coordinator" within the region. This has meant, for example, that the field representatives, who must be thoroughly familiar with the existence and capacities of potential "competitors" (industrial associations, national research institutes, universities, etc.), have had to operate within a policy which permits (even demands) them to refer local clients to local institutions rather than to ICAITI when those institutions have the capacity to satisfy clients' requirements (and not simply to point the client in that direction, but to take him as a PTT client and follow the process through to a satisfactory completion). The flexibility to evolve appropriate relationships within the region will be a continuing requirement for PTT, militating against any fixed and final design for the process.

Communication barriers have contributed to ICAITI's relative historical isolation to Guatemala. The availability of the PTT service has to be communicated to the potential user. The field representatives are keenly aware of this and have been struggling to find effective means of communication. They have made speeches before industrial and commercial groups, developed information materials for general circulation, given newspaper interviews -- and are planning radio interviews -- and made as wide a variety of local contacts as possible, in addition to their visits to target industries.

The ability to furnish documents (to those servicing the client if not to the client himself) is important and the related OAS project concentrates on strengthening this ability in information centers in the Central American countries. But the guts of PTT is face-to-face consultation and assistance provided in the first instance, perhaps, by the field representatives but by no means limited to those few individuals. For PTT, the entire ICAITI professional staff should be available for such direct consultation. In principle this is the case, but there are opportunities for ICAITI to expand this vital role, specifically in taking the expert to the consultant rather than the other way around. With the new asset (and entree) represented by the field representatives, much greater direct communication between clients (and potential clients) and ICAITI staff can and should be attained.

Finally, PTT can be meaningfully conceived, and properly managed, only if it is understood as a distinctly limited activity in a very large field and if its limits are fairly precisely defined. This is an appropriate function during Phase I and such refinement of definition is well underway.

c) Project Participants

1. ICAITI

a) General

ICAITI grew out of a study requested by the Central American Committee of Cooperation (composed of the Ministers of Economy of the Central American Republics) in 1952. The study, conducted by the United Nations' Technical Assistance Administration, recommended in 1953 the creation of ICAITI. This recommendation was approved by the Central American Economic Cooperation Committee in 1955 and ICAITI began operations in 1956, moving to its present (permanent) location in Guatemala City in 1957. ICAITI was established as a non-profit regional organization to advise and provide technical assistance to the region's industrial sector, and to conduct technological research supporting industrial development and exploitation of the region's raw materials and natural resources. ICAITI currently employs some 125 people divided about equally between technical (engineers -- chemical, industrial, mechanical -- bio-chemists, microbiologists, geologists, mathematicians, industrial economists) and administrative personnel. ICAITI's plant facilities include laboratories for organic and inorganic chemistry, leather technology, pulp and paper technology, textiles, food technology, and industrial microbiology. ICAITI's Board of Directors is composed of the five Central American Ministers of Economy and the ICAITI Director who is appointed by the Board. The Director functions through three principal assistants who, in turn, supervise a total of twelve divisions (see Attachment A, ICAITI Organization). In general, ICAITI's long term work plan envisions activities in the areas of research, technical services, consulting services, economic and marketing studies, surveys, analyses and tests, norms and standards, technology transfer, and environmental protection. Specific current activities are listed in Attachment B.

b) Staff. Virtually the entire ICAITI staff can be expected to participate in PTT as the project develops and

expands. Those principal staff members whose functional areas are likely to be most involved with the project have been formed into the PTT Committee. These include the Deputy Director (Committee Chairman), the Assistant Director for Planning and Institutional Development (principal project supervisor), the Applied Research Division Chief, the Technical Industrial Services Division Chief, the Documentation and Information Division Chief, and the Chief of the Budget and Cost Control Division. This committee has been instrumental in nurturing the PTT effort, providing orientation and guidance to the field representatives, assisting them in establishing contacts with industrial firms, directing the ICAITI staff in responding to clients' requirements, and coordinating PTT activities with other activities in which ICAITI is involved. The Technical Industrial Services Division cooperated with an industrial engineer from DRI in developing the methodology for identifying and selecting the industrial sectors for priority PTT attention. This Division has also assisted the field representatives in estimating costs and negotiating contracts for ICAITI services through PTT. The Applied Research Division has provided analytical support in solving technological problems for clients contacted by the field representatives. The Documentation and Information Division has provided substantial direct support to PTT by researching and furnishing information requested by project clients. This Division also has played a major role in coordinating PTT with the related OAS-supported project (discussed below). This evaluation concludes that ICAITI's PTT Committee is a valuable project asset whose role should be continued and perhaps expanded. For example, meetings of the Committee with the field representatives, which have been held so far in Guatemala, might well be rotated among the field offices. Not only would this reduce the time required for the representatives to be away from their stations, but it would also give the Committee members an opportunity to observe at first hand the operating environment of the field representatives, to become more familiar with their operational problems and support requirements, and to participate in contact and client visits. Such meetings should be held no less frequently than bi-monthly.

c) Field Representatives

i. General. The field representatives are the distinguishing feature of PTT. While other elements of the project may be seen as improvements or expansions of previously existing activities and capabilities of ICAITI, the field representatives constitute a new departure offering new opportunities. And more than any other single project element, these representatives hold the key to success for PTT. The idea of a field extension service in ICAITI did not originate with PTT. It had been under consideration for years, but not until the advent of PTT were all the prerequisite conditions for such extension met (funding, training, organizational concept, national acceptability, etc.). ICAITI has chosen the representatives with care and its choices appear eminently well qualified for the task. Summarized below are the principal activities, progress, and problems of each of the three representatives so far.

ii. Carlos González. Mr. González, a native of Guatemala, presently covers Guatemala and Honduras. Based in Guatemala, he works out of ICAITI's central offices and thus did not have the initial requirement of establishing a new office which faced the other representatives. Mr. Gonzalez is an industrial and civil engineer (San Carlos University, Guatemala) who had previously worked for four years in ICAITI's Scientific and Technological Development Division where his responsibilities included technology transfer activities, particularly in the context of earlier OAS-sponsored projects. Prior to joining ICAITI he had worked with both GUATEXPRO, Guatemala's export promotion agency, and INTECAP, the technical training and productivity institute. Thus he brought very respectable credentials to his present assignment.

Mr. González began his PTT activities in October, 1976, initially visiting various industrial organizations in Guatemala to introduce the program. In November he accompanied ICAITI's Director to Honduras where the latter officially introduced him to appropriate organizations including the

Honduras Directorate of Industry, the Chamber of Industry, CABEI, the Honduras Development Institute, and the Central Bank. He subsequently visited Tegucigalpa and San Pedro Sula (in February) to begin establishing contacts with potential clients for PTT services. As with the other representatives, Mr. Gonzalez discovered the need for some explanatory material with which he could brief prospective clients and which he could leave with them as reminders of PTT services. Consequently, he helped prepare a brochure on ICAITI and PTT services which ICAITI subsequently published and which is now routinely employed by all the field representatives. (The need for such promotional services is a continuing one and some thought might usefully be given to providing such support without tasking the field representatives with full responsibility for it, perhaps through contracted services if available funding permits). In November he spent two weeks in the United States and Canada attending technology transfer orientation courses.

So far Mr. Gonzalez has visited about 20 enterprises to offer PTT services. These visits have generated 7 requests for services (5 in Guatemala, 2 in Honduras). Three of these were for information which ICAITI's information center was able to provide (only one of these services was reimbursed; the information center was not prepared initially to provide the field representatives with costs of services, but it soon remedied that deficiency at the demand of the representatives). The other four requests entailed more than information alone. They included: a market study (with subsequent production advice and assistance) for a new dehydrated soup product; a chemical assistance project in the cosmetics field; a feasibility study for a new cereal product; and training and technical assistance for a textile firm. So far only one of these potential projects has come to fruition (ICAITI is preparing cost estimates and contract proposals for the others): this resulted in a contract for a market study and advice on product production.

Mr. Gonzalez' experience to date exemplifies the multifaceted role of the field representative as salesman,

industrial engineer, public relations agent, negotiator, and technology transfer coordinator.

iii. Jaime González. Mr. Jaime González, a native of El Salvador, covers that country and Nicaragua for PTT. He is a food technology engineer whose studies included a year at Wisconsin University. Prior to his PTT assignment in October, he had worked in ICAITI's Applied Research Division for seven years. After attending the North American orientation courses in November, he accompanied the ICAITI Director to San Salvador and Managua for a series of official introductions to appropriate industrial, technological, information, and development agencies. His first task was to establish a PTT office in San Salvador where he was able to negotiate a satisfactory arrangement with the El Salvador Association of Industry (an association of private sector industrial firms). The Association provides office space, supplies, and part-time secretarial assistance at no charge. Other costs (telephone, photocopying, etc.) are billed to ICAITI.

Once the office was established, Mr. Gonzalez began visiting organizations in both the public and private sectors, explaining the program and soliciting requests for services. In his contacts with the local industrial information center, he discovered a backlog of requests for information which that agency had not been able to provide. He established contact with the requesting firms and, through support from ICAITI's information center, was able to respond to the requirements of some 25 clients (again, this was before ICAITI had established standard costing procedures for PTT information services, so most of this information was provided at no charge to the client). Additionally, he found two clients requiring analytical support, one seeking quality control assistance in the production of cardboard, the other needing analysis of a food product to discover the cause of discoloring. ICAITI was able to satisfy these requests and was remunerated for its services.

At the time of this evaluation Mr. Gonzalez had not yet begun visiting potential clients in Nicaragua (a two-week

visit was scheduled for April), so no assessment of potential demand was available for that country. But he noted that the time and effort expended in publicizing the program in El Salvador was beginning to reap dividends as firms were taking the initiative to contact him with requests for information and services.

iv. Felix del Barco. Mr. del Barco, a Costa Rican, is the field representative for Costa Rica with his office located in San Jose. The newest of the PTT team members, he joined the program in January, 1977. He holds a BS degree in Marine Science and a Master's in food technology (he has studied in both Mexico and Brazil). He had spent over four years with the University of Costa Rica (in its Food Technology Research Center) prior to joining the PTT effort. After two weeks of project orientation at ICAITI (he is scheduled for two weeks of training in the United States in April), he returned to Costa Rica where he first arranged for office space in the local Chamber of Industry (establishing a relationship similar to that of the project office in San Salvador). He noted some delays in getting sufficient office equipment: desk, chair, filing cabinet (ICAITI was working on the problem: such basic support of the field representatives should be given priority attention in order to maintain substantive project momentum with minimum distractions of this nature). Since then he has been establishing contacts with representatives of the public and private industrial sectors in Costa Rica to introduce and explain PTT. At the time of this evaluation, no PTT projects in Costa Rica had been completed, but Mr. del Barco was beginning to stimulate potential client interests and embryonic requests for services were developing in the food industry, the project's first priority area (including client interest in analysis and standards for meat, vegetable, seed, and dairy products, technical assistance in food processing, and training in packaging of foods for export to the United States). He also has provided close coordination between ICAITI and CONICIT (Costa Rica's National Commission for Science and Technology) which is the local focal point of the industrial information project sponsored by the OAS and

coordinated by ICAITI. Mr. Del Barco noted that he had met several representatives of Panamanian industry who suggested a possible demand for PTT services in that country. While the present scope of PTT does not encompass Panama (which is not a constituent member of ICAITI), project planners should not overlook the future possibilities of extending PTT coverage.

v. Overview. The evaluators were very favorably impressed with the personal and professional qualifications of the field representatives and their enthusiasm in pursuing PTT objectives. They are the only ICAITI personnel who devote all their time to the project and they are in a position to make major contributions to the success of the project. Although they have just scratched the surface of the industrial field in Central America, they have quickly generated PTT clients (and, so far, ICAITI has been able to respond to all requests). They have gained a solid understanding of their PTT role and they are aggressively "directing the process of identification, gathering, adapting, distributing, and following up needed technology to end users" as envisioned in the Project Paper. In the process they are stimulating a rationalization of ICAITI activities throughout the region. At their instigation ICAITI is now compiling and periodically distributing to them lists of all ongoing and planned ICAITI activities, and any service requests which ICAITI may receive directly are responded to through, or in coordination with, the field representatives. Communication is a vital element in the role of the field representatives and they spend a good deal of time on the telephone with clients and with ICAITI staff. This is as it should be, and project planners should ensure continued adequacy of funding support for all communications requirements. These representatives also are beginning to sharpen their negotiating skills with the assistance of ICAITI's technical staff in preparing cost estimates. Part of their task entails the education of potential clients on the costs and benefits of technological information and assistance, and they are consciously carrying out this function, converting latent into real demand. ICAITI, from top management on through the technical divisions, has

rendered needed support to the field representatives with whom close and easy communications are maintained. At the latter's request ICAITI recently established a revolving petty cash fund to aid the operations of those representatives outside Guatemala. Such responsive support should continue. The field representatives appear to have successfully gotten over the first hurdle of establishing cordial working relationships with the local industrial communities and allaying any fears of territorial aggrandizement to the detriment of local concerns. They have also taken the initial steps in the essential publicity of the program. By the time of this evaluation, the field representatives and ICAITI were reaching the point of sufficient experience to begin standardizing operating procedures. For example, one field representative at the outset was using two report forms: one for information requests and one for other types of services. Another representative was using only one form. Experience has suggested the utility of one report form for all contacts and client requests. Initially the reports might be forwarded to various places in ICAITI; now all seem better controlled by routing through a central point (the Project Supervisor's office). All such procedures should be standardized as soon as possible. In this connection we suggest consideration be given to the preparation of a manual of standard procedures for all PTT activities. Such a handbook might include the field representatives' functions, accounting and costing methods, guidance on uniform terminology, procedures for acquiring information and assistance outside the region, standard forms and reporting formats, description of relationships with OAS and other related activities, and so on: an overall description of how PTT works. Such a compendium might be produced by ICAITI with various contributions from the field representatives, ICAITI technical and administrative staff, and others as appropriate. While we think such a guide would be useful as early as possible, its preparation should not detract significantly from time available for pursuit of principal project objectives, especially during the feasibility study. But it should precede progress into Phase II and would be helpful in Phase I. The field representatives expressed a need for more definitive guidance

in preparing requests for information and assistance, especially in cases where extra-regional resources must be called upon (this is a crucial aspect of the communications process in technology transfer and already there have been cases where requests had to be resubmitted because original responses were off target due to misunderstood or insufficiently precise taskings). This might appropriately be the subject of a consultative visit from one of the U.S. backup agencies in conjunction with ICAITI professional staff members. A related requirement is for adequate general communication between ICAITI's professional staff and the field representatives. So far such communication appears to have been adequate, though somewhat unstructured, principally at the initiative of the field representatives (who do have easy and ready access to the entire ICAITI staff). We suggest that more regular, and frequent, meetings of the Project Committee with the field representatives might help accelerate progress during the feasibility study. Timing of such meetings would have to be balanced against the need for the representatives to spend as much time as possible extending their range of contacts in the field, but we think these kinds of general review sessions should be conducted no less frequently than bi-monthly. To minimize the detraction from the field representatives' main efforts, they might appropriately be held variously in Costa Rica and El Salvador as well as in Guatemala (perhaps in conjunction with the ongoing series of information workshops or similar sessions). Such a schedule also would provide the ICAITI staff an opportunity to get a first hand look at local PTT operations, including problems which they might help solve, as well as a chance to participate directly in contacts with clients or prospective clients. The question of the most appropriate number of field representatives should receive continuing attention. As stressed in this report, they are the indispensable element of PTT. The Project Paper envisioned no more than those now employed during the pilot stage. We find this to be an adequate number at present given the support requirements to be worked out and the funds available for Phase I, but should the project move into Phase II, an expansion of the field staff might be in order, depending on apparent demand of PTT services, success of previous efforts to supply adequate

services and elicit adequate remuneration, and related factors which should be closely monitored throughout Phase I (the project paper envisioned at least one field representative per country in Phase II). Based on experience thus far, the field representatives calculate that they can make between 15 and 30 contacts a month (depending on the time required to service the requests from those contacts who become clients). If this rate can be maintained, the field staff should have averaged between 50 and 100 contacts per country by the time of the next evaluation (scheduled for September), with some percentage of these having surfaced requests for PTT services. That quantity should offer an ample sample to permit tentative conclusions, at that time, foreshadowing the more definitive conclusions to be expected from the final Phase I evaluation in the Spring of 1978.

2. Technical Assistance

In developing and initiating the project, the principal institutions providing technical assistance to ICAITI have been DRI, IITRI, and Georgia Tech. The contributions of each of these is discussed below (it should be noted that the evaluators have not had the advantage of direct contact with representatives of these institutions who were unable to be in Guatemala during the course of the evaluation).

a) DRI. ICAITI contracted the services of DRI in September, 1976, to assist in several aspects of project initiation. DRI representatives, in several visits to ICAITI, helped define the organizational features and modus operandi of PTT, worked on the original schedule of project activities, participated in identifying the industrial sectors for priority PTT attention, established a U.S. technology transfer support mechanism (through DRI's facilities in Denver), and organized the initial training program for the field representatives. In addition to the general orientation provided the representatives at Denver, DRI arranged for auxilliary training in Canada through the Canadian Government's National Research Council, which provides technical assistance to Canadian industry at no cost to industry, and in Georgia through Georgia Tech's Engineering Experiment Station, which provides technological support to Georgia industries (on a fee basis) as well as

assists new industries in getting established in Georgia. The field representatives found the Georgia Tech operation more analogous to PTT than the Canadian, both because it pays its own way and because it employs a system of full-time field agents whose functions are similar to those of PTT's field representatives (and whose experience, therefore, is more germane to the PTT undertaking). Subsequent project planning has scheduled additional training for field representatives and others (for example, representatives of cooperating national organizations) through the Georgia Tech system. DRI has essentially completed the services called for in its contract with ICAITI although some contract funds remain unexpended from the original total of $19,000. ICAITI is considering a new contract with DRI to provide backup support for PTT services and has thought of incorporating any previously unexpended monies into such a contract. We see no operational objection to this approach, but we note that the original contract established a fixed cost for services and thus any new arrangement would be subject to satisfactory renegotiation with DRI. In any case ICAITI should attach priority to its establishment of an ongoing working relationship with its contractors for needed technical support so as not to impede the project's forward momentum (and DRI should submit a comprehensive report of its activities and services to PTT to date).

b) IITRI. ICAITI has not yet formalized its contractual relationship with IITRI. The contract terms originally proposed by ICAITI were not acceptable to IITRI which preferred a larger initial payment than proposed by ICAITI (which proposed an initial payment of $10,000 followed by three equal payments at six month intervals and a similar final payment for an 18-month, $50,000 contract; IITRI proposed an initial payment of $25,000 followed by periodic, smaller payments). ROCAP found ICAITI's original proposal more appropriate than that of IITRI, but the question has not been resolved and no contract has been executed between ICAITI and IITRI. Nevertheless, IITRI has proceeded with some of the services envisioned under the proposed contract including drafting a project evaluation plan, determining evaluation

criteria, developing data collection methods and measurement techniques, recommending responsibilities for various project participants, and coordinating these efforts with those of DRI and others. At this stage ICAITI is considering proposing new contract negotiations to reimburse IITRI for services rendered to date and to establish a continuing contractual relationship whereby IITRI would provide ICAITI services on an as-needed basis to support PTT requirements. The evaluators find this an acceptable approach if such arrangements can be satisfactorily negotiated between ICAITI and IITRI. In any case ICAITI should move quickly to regularize its working relationship with IITRI (and IITRI should submit a comprehensive report of its activities and contributions to the project so far). ROCAP should be prepared to assist as appropriate in this regard to ensure that the project receives all desireable support during the feasibility stage.

3. OAS

a) The OAS Project. The Organization of American States is supporting an information project which is related to the PTT effort. Begun in 1976, that project is designed to help develop national information facilities and services oriented toward the industrial sector in Central America. The project follows an earlier OAS effort which sought to foster exchange of information among all the Latin American countries. That effort proved to be too difuse, and the current project seeks to concentrate on a narrower target. The project supports selected agencies with information services in each Central American country (as well as in the Dominican Republic). These agencies are, in Guatemala and El Salvador, the national productivity centers, in Honduras the national university and the central bank, in Nicaragua the central bank, and in Costa Rica the national technological institute. The goals of the project are to improve these agencies' capacities for dissemination of technical information, search and retrieval of such information, and liaison with the industrial sector. To date the project has sponsored several seminars and is presently focusing on building up information sources. The OAS is providing about $150,000 a year and anticipates a four-year project effort. ICAITI receives $15,000 a year to

serve as project coordinator including promulgating uniform standards, assisting in retrieval of information from sources outside the region, monitoring priority information areas based on national industrial development policies, and facilitating the exchange of information among the participating countries. Thus ICAITI is in a good position to coordinate the OAS and PTT activities. The OAS project has been helpful in strengthening the understanding of capabilities and the working relationships between ICAITI and the national agencies, and in keeping the latter abreast of PTT activities. And PTT's field representatives provide additional coordination at the local level.

b) Mutual Support Activities. With the coordination which ICAITI is able to provide, the OAS and PTT efforts can be mutually reinforcing. Under the OAS project ICAITI has augmented the personnel of its Documentation and Information Division to facilitate information handling and to more rapidly respond to requests for information. Under PTT that Division is acquiring some equipment which will cut search and retrieval time in half as well as some information services to speed the acquisition of technical information from outside the region. These activities provide valuable support to both projects. (There is also a mutually supportive relationship between ICAITI, in implementation of these two projects, and the ROCAP-supported Agricultural Research and Information System Project. That project has provided technical assistance to ICAITI in upgrading and standardizing its information coding and retrieval procedures, while ICAITI has provided training to that project's participants through the OAS-supported seminars on information systems). This evaluation concludes that ICAITI has done a good job in coordinating these two projects in their early stages. ICAITI should continue in this important role while clearly maintaining the separate though related objectives of the two projects.

4. National Entities. As noted in various respects throughout this report, public and private agencies within each of the Central American countries play an important role in PTT. The field representatives enjoy the direct

support of the specific agencies providing their offices. There is a useful tie to those national agencies participating in the OAS-sponsored project. And the field representatives must maintain close working relationships with all those national entities whose functions and responsibilities are related to those of ICAITI and PTT. These include local universities, institutes of technology, industrial development institutes, banks and other financial institutions, elements of economy and other national ministries, national planning commissions, scientific research centers, and a variety of private associations. All of these can contribute materially to the success of PTT and the project personnel must devote time to establishing and maintaining contacts with them. Representatives of such national entities are scheduled to participate in PTT-sponsored training to further strengthen their understanding of the technology transfer process as well as the ties between PTT and their organizations. Such participation is to be encouraged as are all forms of mutual support, understanding, and cooperation with those national entities which have an interest in PTT and which can contribute to the project's achievement of its objectives. At the same time, project supervisors should take pains to get the most serviceable use of the field representatives' time in establishing contacts with potential clients and generating requests for PTT services. While close working relationships with the kinds of organizations mentioned above are essential to this process, they do not necessarily generate the real demand for PTT which must be established in Phase I. Thus project managers should be alert to ways of supporting the field representatives in this regard (perhaps by employing other ICAITI staff members more actively in liaison with these national entities).

The necessity for, and the advantages to be derived from, close association with the panoply of national organizations in each country argues for at least one field representative in each country. While this possible eventuality would need to be weighed against countervailing factors (such as budget requirements and limitations), it should be further scrutinized in subsequent evaluations, specifically with a view to possible expansion of the field staff should the project proceed into Phase II.

5. Recommendations. The following recommendations are grouped by action agent: ROCAP, ICAITI, contractors, and joint actions. An additional group of recommendations is provided for future evaluations by the time of which sufficient operational experience will have been accumulated to permit more definitive conclusions than have been drawn in this initial appraisal.

a. ROCAP

1) ROCAP should be mindful of the requirement for a revised Project Paper. This was called for by the DAEC as a condition for proceeding into Phase II, and the original Project Paper anticipated the same requirement. The revised paper should identify more specific, relevant outputs expected as well as more definitive indicators of output achievement.

2) ROCAP should take the necessary steps to insure timely obligation and subobligation of available project funds, not simply as a function of good programming but to promote the maintenance of project momentum.

3) ROCAP should provide any necessary assistance to ICAITI in the latter's efforts to arrange for extraregional support including negotiation/renegotiation of agreements with contractors as appropriate.

4) ROCAP should assure that a sufficient portion of budgeted funds is assigned to support the costs of communication (meetings, travel, telephone, telegram, etc.) for the field representatives and other project participants.

b. ICAITI

1) ICAITI should prepare a monthly summary of information provided in the contact reports filed by the field representatives each month. This will permit easy, regular, and systematic review of project progress and will provide a check on the adequacy of the information contained in the

contact reports. The monthly summaries should highlight information such as the total number of contacts (by country), number of clients identified, size of firm represented (large, medium, small), industrial sectors of firms contacted, number of PTT requests serviced, origin of services (local, regional, extraregional), cost of services, costs reimbursed, number of requests in process (not completed), number of unserviceable requests, and any problems noted during the month. These monthly summaries will provide a useful record of project progress and will facilitate the continuing evaluative process by project planners and supervisors. Their preparation, as well as related activities (other compilations or reviews and any liaison needed for their preparation), might appropriately be a task for the Guatemalan field representative, who is located in ICAITI headquarters.

2) ICAITI should schedule regular meetings of the PTT Committee and the field representatives no less frequently than bi-monthly at this stage of the project. The site of such meetings should be rotated between Guatemala and the field offices, both to reduce the time away from station of the field representatives and to provide the Committee members a chance to expand their local contacts and familiarity with the various national environments.

3) To insure the success of the Phase I feasibility study, ICAITI should take all possible steps to maximize the number of PTT contacts and clients established. Funding support for all requisite activities of the field representatives should be assured. In this regard, any proposals which do not directly support this objective (such as equipment procurement) should be viewed skeptically during Phase I. A related requirement is that the field representatives begin operating in second and third priority industrial sectors as soon as practicable to insure that the Phase I experience is representative.

4) ICAITI should immediately establish standard procedures for the contact reports (content, routing, dissemination, filing, etc.).

5) ICAITI should give consideration to preparing and publishing a PTT manual which might include such items as a description of the functions of the field representatives, standard forms and reporting formats, PTT responsibilities of the ICAITI staff, uniform PTT terminology, accounting and costing procedures for PTT services, procedures for acquiring technical information and assistance extraregionally, and a description of how PTT activities relate to OAS-sponsored and other ICAITI activities. Such a handbook need not be an elaborate production but should meet the practical needs of the ICAITI staff, the field representatives, and others directly or indirectly participating in the project. However, ICAITI should take care that this activity not pose a significant detraction from the time and effort devoted to the project's principal objectives.

6) ICAITI should expedite the resolution of any unfilled basic support requirements of the field representatives such as office equipment.

7) ICAITI should take measures to stimulate the project's momentum in Costa Rica where the field representative is off to a late start and where ICAITI traditionally has less experience than elsewhere in Central America. This might take the form of special visits by the ICAITI Director, regular staff visits, or other forms.

8) ICAITI should continue in its role as technology transfer coordinator of potentially competitive agencies in Central America. Concurrently ICAITI should make sure that its records reflect clients identified by PTT even though those clients' needs may be serviced by other agencies or institutions.

9) ICAITI should continue and expand its efforts to provide on-site, direct communication between its technical staff and its PTT clients (both potential and real), both to further augment staff support of the field representatives and to assure maximum satisfaction of client needs.

10) ICAITI should monitor and evaluate the relationships between the costs of PTT services to ICAITI, the price charged the clients, and the value of those services to the clients, with a view to increasing the percentage of costs recovered from users. Guidance to the field representatives and other negotiators should be to obtain the maximum price for services (within the constraints of the client's ability to pay and of concluding desired contracts). Feedback from the field representatives on their experiences in this regard should be incorporated into the continuing monitoring and evaluating process.

11) ICAITI should continue to strengthen and expand its contacts with other sources of technology, including private industrial firms, both within and without Central America. For local contacts this may include further U.S. training of representatives of national institutions, their participation in local PTT-sponsored seminars, participation of ICAITI personnel in meetings and seminars sponsored by local agencies, and contracted services from national institutions or local individuals when appropriate. For extraregional contacts this may include continuing requests for backup support from contracted institutions, participation of their representatives in local PTT seminars and meetings, and the extension of such relationships to other institutions. This extension might appropriately be limited to the United States during Phase I, but ongoing consideration should be given to other extraregional sources of needed technology.

12) ICAITI should assure that the communications requirements of the field representatives are met, and the field representatives should be reassured in this regard so that they feel no unwarranted constraints in making all necessary communications. Satisfaction of PTT communications requirements of other ICAITI staff members should be similarly assured.

13) ICAITI should direct priority attention to negotiating/renegotiating all necessary contractual relationships to insure not only that these do not impede progress

but also that maximum desired technical information and assistance is provided to the project.

14) Bearing in mind the central importance of the field representatives to PTT, ICAITI should develop contingency plans to be followed in the event any field representative should be lost to the project. This might include tentative identification of potential replacements as well as positive designation of backup representatives who could immediately step in, pending assignment of a permanent replacement, should the need arise.

15) ICAITI should maintain separate files for supporting documentation of all project charges billed to ROCAP (or take any alternative measures to make sure that retention of such cost accounting documents will satisfy AID requirements).

16) ICAITI should provide to ROCAP copies of all contracts funded under the project (including the contracts with the field representatives) for review prior to execution by ICAITI.

17) Due to a duplicate billing of $20[illegible].78 in ICAITI's reimbursement request to ROCAP (for costs through December 31, 1976), the next reimbursement voucher should be reduced by that amount.

18) In accordance with Administrative and Fiscal Provisions (Annex E to Project Agreement 76-9 and Annex D to Project Agreement T.Q.#7), ICAITI should not bill ROCAP for costs of employee benefits. The next reimbursement voucher should be reduced by the amount of any such costs previously billed and reimbursed by ROCAP.

c. Contractors

1) DRI. DRI should submit to ICAITI a comprehensive report of its project activities and services to date. DRI also should work with ICAITI to expedite negotiation of arrangements for any further services to the project.

2) IITRI. IITRI should submit to ICAITI a comprehensive report of its project activities and services to date. IITRI also should work with ICAITI to expeditiously come to an understanding regarding previous services and to negotiate arrangements for any further services to the project.

d. Joint Actions

1) ROCAP and ICAITI should review and revise the PERT to reflect the current situation and to provide a realistic and useful schedule for future activities as a matter of first priority.

2) ROCAP and ICAITI should discuss and consider the advisability at this time of researching the possibilities for financing technology transfers, the costs of which prove beyond a client's ability to fund and beyond ICAITI and the project's capacity to subsidize. Should such research appear presently advisable, consideration should be given to consultant assistance to keep from taking up the time of active project participants.

3) ROCAP and ICAITI should address the expressed need of the field representatives for more guidance and instruction on communicating requests for information, assistance, or technological applications. Consideration should be given to including contributions from those backup institutions which may be called upon to respond to such inquiries.

e. Considerations for Future Evaluations

1) The next evaluation (scheduled for September, 1977) should include the participation of technology transfer professionals outside of ROCAP and ICAITI. Possible employment of Professor Rubenstein is suggested in view of his knowledge as evidenced by the pertinence of his work to this first evaluation. Representatives of institutions contracted by ICAITI for support services might be considered also. As recommended in the Project Paper, the third evaluation (and final one in Phase I) should include, if feasible, the participation

of AID/Washington (Latin America Bureau, TAB) as well as ICAITI, ROCAP, end users of PTT services, and appropriate consultants.

2) The next evaluation should assay a survey of end users of PTT services. The use of written questionnaires is not considered the best technique for such a sampling. Structured interviews will be preferable. These might be conducted directly or, possibly, by telephone.

3) The second evaluation should tentatively address the question of the most serviceable number of PTT field representatives. The third evaluation (Spring, 1978) should seek to draw definitive conclusions on this question.

4) Future evaluations should devote some attention to the adequacy of PTT communications including those between field representatives and clients, between field representatives and ICAITI, and between ICAITI and extraregional sources of technical information and assistance.

5) The next evaluation should make a judgement on how representative PTT activities and experiences by that time have been. This should include such considerations as the number of contacts/clients established, the size and industrial sectors of the firms contacted/serviced, and the geographical areas covered. Specific recommendations should be made for any actions deemed necessary to insure that Phase 1 renders adequate experience upon which to evaluate longer-term prospects.

6) Future evaluations should review ICAITI's experiences in negotiations including those with clients as well as those with sources of services outside the region. Specific attention should be paid not only to the basic question of the success of such negotiations but also to the comparative costs of technology acquisitions and their relation to the prices negotiated with end users of services.

7) Future evaluations should examine the PTT experience in meeting the requirements for analyses (economic and

technical) of clients' needs and for the engineering of other technical assistance necessary for clients' full adaptation of transferred technology. Any employment of local institutions or individuals as well as extraregional professional consultants should be included in the examination. The relevance of inputs from extraregional sources to PTT also should be ascertained.

8) Future evaluations should employ competent observers qualified, and confident of their abilities, to draw judgemental conclusions. For example, although ICAITI may aim for full remuneration from clients for costs of services rendered (and may establish that as a goal for field representatives and other negotiators), failure to achieve that target would not necessarily signal the failure of the project. Similarly, the field representatives might be set a goal of one contact/client per day, but a shortfall from such a target would not inevitably indicate failure to make adequate progress toward project objectives. Thus any evaluation will rely on the sound judgements of knowledgeable evaluators who should be prepared and equipped to make such qualitative judgements to augment any quantitative measurements.

ATTACHMENTS TO PROJECT APPRAISAL
REPORT 77-4: TRANSFER OF TECHNOLOGY

A. Chart: ICAITI Organization

B. Summary List of Current ICAITI Activities

C. PERT Activities

D. Report on Cost Control and Accounting

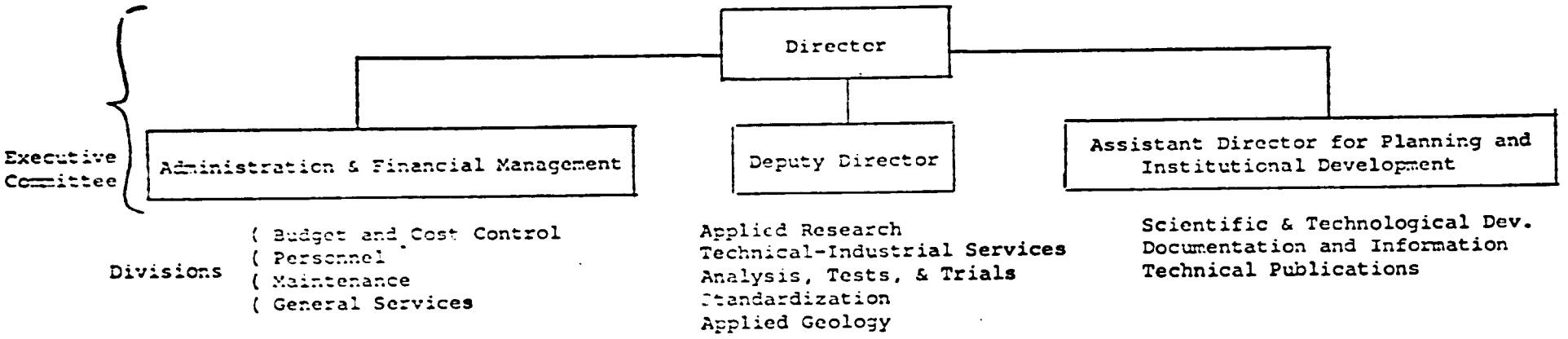
E. Report on Identification of Priority Industrial Sectors

F. Table Summary of PTT Activities

ATTACHMENT A

INSTITUTO CENTROAMERICANO DE INVESTIGACION Y TECNOLOGIA INDUSTRIAL
ICAITI

Board of Directors*



*ICAITI's Board of Directors is composed of the Central American Ministers of Economy and the ICAITI Director who is appointed by the Board.

ATTACHMENT B

Summary List of Current ICAITI Activities

1. Industrialization of Food Products. Sponsored by the OAS.
   Purpose: To improve human and animal diets while reducing extra regional imports.
   Focus : Regional sources of protein, starches, fats; use of tropical fruits.

2. Industrialization of Tropical Woods
   Purpose: Regional raw materials for pulp and paper.
   Focus : Agro-industrial residues, fibrous plants, tropical trees.

3. Vegetable Extracts. Sponsored by the OAS.
   Purpose: Develop extracts from edible plants.
   Focus : Food, medicine

4. Drying and Preservation of Wood. Sponsored by IDB.
   Purpose: Obtain information on preservation of wood product
   Focus : Tropical woods.

5. Sugar Cane by-Products
   Purpose: Study technical possibilities for manufacturing useful commodities from sugar cane.
   Focus : Fuels (alcohol), plastics, pulp

6. Intermediate Chemicals
   Purpose: Determine possibilities for establishing a basic industry for production of chemicals.
   Focus : Wood extracts, fermentation of cane products.

7. Low-Cost Housing Construction Materials.
   Purpose: Evaluate applicability of new technologies in housing construction.
   Focus : Applicability to low-cost housing

8. Dominican Republic Industrial Technology Institute
   Purpose: Provide technical advice to INDO TEC.

9. Sugar Chemistry
   Purpose: Manufacture ethyl alcohol.
   Focus : Sugar cane extracts.

10. Proposed Standards
   Purpose: To provide, on a continuing basis, norms and standards of industrial quality for Central America.

11. Export Product Standards
   Purpose: Establish standards for agricultural products grown for exports.

12. Laboratory Analysis, Origin of Goods
   Purpose: Certify origin of raw and manufactured materials.

13. Insecticide Residue Analysis
   Purpose: Determine insecticide residues in products for export.
   Focus : Meats for export to the United States.

14. Use of Pesticides in Cotton Production. Sponsored by the United Nations.
   Purpose: Study the Economic and Environmental consequences of Pesticides.
   Focus : Reducing number of applications required.

15. Mobile Microbiological Laboratory Unit
   Purpose: Provide microbiological analysis throughout Central America.
   Focus : Food processing hygiene.

16. Industrial Information Center
   Purpose: Improve the use of information by governments and industries in Central America.
   Focus : Scientific, technological, and economic informatior

17. Applied Geology
   Purpose: Advise engineering projects.
   Focus : Hydro-electric development, potable water, highway construction.

18. Regional Industrial Development. Assisted by the UNDP.
Purpose: Provide Development Advice.
Focus : Joint effort with SIECA, CABEI, and CEPAL.

19. Regional Energy Development Plan. Assisted by the UNDP.
Purpose: Evaluate energy resources (with SIECA and CEPAL)
Focus : Petroleum, coal, geo-thermal.

ATTACHMENT C

Program of Technology Transfer
PERT Activities

This paper cites the activities (and their agents) specified in the project PERT (as revised in August, 1976) and provides comments on the status of accomplishment of those activities (as scheduled up to the time of this evaluation). These PERT activities are those planned under Project Agreement T.Q.#7.

Activity Number	Description and Planned Completion Date	Action Agent(s)
0-1	Prepare a ProAg and obtain signatures of parties (15 June 76)	ICAITI-ROCAP

Comment. Accomplished

1-2	Select and contract a consulting firm (CFE) specializing in the evaluation and monitoring of technological transfer systems. (1 Aug. 76)	ICAITI-ROCAP

Comment. IITRI was selected as the firm to be contracted. As discussed in the body of this evaluation report, no satisfactory contract has yet been negotiated between ICAITI and IITRI. Nevertheless, IITRI has provided the basic services envisioned under the planned contract.

1-3	Select and contract a consulting firm (CFTT) specialized in the design of technology transfer systems and in the marketing of technology. (1 Aug.76)	ICAITI-ROCAP

Comment. DRI was selected and contracted. DRI's services were initiated on schedule although the contract was not finally executed until October, 1976.

1-4	Select and contract a consulting firm (CFT) specializing in training personnel to be technology transfer agents. (1 Aug. 76)	ICAITI-ROCAP

Comment. DRI was selected for this task under the contract mentioned above.

1-5	Select and assign supportive personnel to form a project committee to assist ICAITI's Project Manager. (1 Aug. 76)	ICAITI

Comment. This was accomplished with ICAITI's establishment of the PTT Advisory Committee which continues to advise and assist the project.

1-6	Select and contract a consulting firm specialized in administrative systems procedures to assist in institutionalizing the PTT system in ICAITI. (1 Aug. 76)	ICAITI-ROCAP

Comment. This was accomplished by an ICAITI contract with Mr. James Blackledge.

3-7	Prepare and submit to ICAITI and ROCAP not later than the 10th of the following month, a monthly report on the technology transfer information assistance and services.	DRI

Comment. DRI's reports have been intermittent rather than regular. As recommended in the evaluation report, DRI should prepare and submit an updated report summarizing activities to date.

5-8	Select and hire field agents and arrange for their participation to receive training. (15 Sept. 76)	ICAITI-ROCAP

Comment. Only two of the three field representatives were hired on schedule. The third was not hired until January, 1977.

1-10	Prepare ProAg and supportive PIO/Ts for T.Q. Funding.	ROCAP

Comment. The Project Agreement (T.Q.#7) was executed on schedule, but supportive project implementation orders were not executed until March, 1977.

2-11	Design an evaluation and monitoring system and test it during the first three months of operation. Make adjustments as necessary and submit the final design to ICAITI. (30 Oct.76)	IITRI-AHR

Comment. A final design has not yet been submitted. IITRI has done some preliminary design work and ICAITI is employing modified versions of the monitoring forms designed by IITRI. October 1976 was probably too early a date to expect final designs (in fact, designs will continue to be tested throughout Phase I). Nevertheless, at this stage, IITRI should provide ICAITI a status report on its efforts to date.

3-12	Design a basic program for technology transfer information, assistance and services of the PTT North American back-up support system. (30 Oct.76)	DRI

Comment. Again, October was probably too early to expect completion of this task. DRI has discussed the program design with ICAITI, and that design continues to be shaped by the accumulating experience with the project, but DRI should submit an updated status report on its efforts in this regard.

5-14	Prepare a detailed implementation plan and revised PERT network for the transfer of technology (PTT) including the evaluation and monitoring needs and training requirements. (30 Oct.76)	ICAITI-DRI-IITRI/AHR

Comment. This has not yet been done. Insufficient experience was available for a revised PERT in October, 1976. Such is not now the case, and a revised PERT should be a priority undertaking for project planners.

4-15	Design training program and train field agents and national support personnel (NSP), coordinating inputs from all participating agencies, including the two workshops to be imparted by DRI. (30 Oct.76)	CFT

Comment. DRI prepared and coordinated a training program in the United States and Canada. Two field representatives participated in this training in October/November, 1976. Training for the third field representative and selected national support personnel is scheduled for April, 1977. The workshops were not conducted because the scheduled date was not timely (too early). Rescheduling of these ongoing training activities should be reflected in the revised PERT.

8-15	Participate in training for field agents and National Support personnel. (30 Oct.76)	Field Agents-NSP

Comment. See preceding comment.

8-17	Select office space and place the field representatives in their place of residence, including assigning necessary personnel and providing back-up support. (30 Nov. 76)	ICAITI

Comment. This was accomplished but with some slippage in the timetable. The representative for El Salvador/Nicaragua established his field office in December after completion of training. The Costa Rican representative established a local office in February after joining the project in January.

5-17	Analyze and select industrial sectors most promising as potential customers for the sale of technology and begin to identify potential clients. (31 Dec. 76)	ICAITI

Comment. This was accomplished jointly by ICAITI and DRI.

10-19	Prepare ProAg and supportive PIO/Ts for FY 1977 funding. (31 Dec.76)	ROCAP

Comment. This has been postponed. New scheduling for this activity should be reflected in the revised PERT.

17-20	Contact technology users and identify a specific user that requires the assistance for solving a technical problem. (15 Jan.77)	ICAITI

Comment. This was accomplished on schedule as the field representatives began making contacts and identifying clients.

12-21	Provide back-up support for design and implementation of the PTT system, and submit information for proper evaluation of the system. (31 Jan.77)	CFTT

Comment. These activities are commented on above. They should be thought of as continuing activities. Still, to repeat, both DRI and IITRI should submit updated reports on their respective activities.

6-23	Assist ICAITI in institutionalizing the PTT service within the organizations. Prepare a work plan and visits and prepare reports at the completion of each visit submitting copies of same to ROCAP and ICAITI. (31 Jan.77)	RIMC (Blackledge)

Comment. This assistance has been provided by the contractor.

11-24	Make first general evaluation of progress to date, emphasizing the improvement of a permanent evaluation system with related services. Submit recommendation to improve PTT services. (15 Feb.77)	IITRI/AHR ICAITI-DRI-ROCAP

Comment. The evaluation reported herein fulfills this requirement. It is regrettable that neither IITRI nor DRI was able to make representatives available to participate in the evaluation. Project planning (and the revised PERT) should include participation of experts from outside the region in subsequent evaluations.

20-25	Request information for PTT action for the solution of the identified problem, in accordance with recommended procedure, from DRI and/or other pertinent organizations. (15 Feb. 77)	ICAITI

Comment. This has been accomplished by ICAITI with reference to DRI and other U.S. sources.

21-26	Update the design of the PTT system as per recommendation from general evaluation. (28 Feb. 77)	CFTT

Comment. This is an ongoing process. It should be addressed specifically by ICAITI, ROCAP, and others, as appropriate, based on this evaluation as a whole.

25-28	Secure information to solve the identified problem directly from ICAITI, the North American information back-up system or any other technical organization within Central America and pass it to the user. (15 Mar.77)	ICAITI

Comment. This has been accomplished in a number of project cases developed by the field representatives.

UNITED STATES GOVERNMENT

ATTACHMENT D

Memorandum

TO : Mr. Henry L. Braddock, APO

DATE: March 28, 1977

Thru: Mr. Douglas S. Franklin, RFA

FROM : Richard W. Layton, FA

SUBJECT: Adequacy of Controls Established by ICAITI for Funds Provided Under Project 596-11-690-066 Transfer of Technology

At your request Ms. Concepción Castro and I visited the office of ICAITI on March 22, 1977, and met with Mr. Mario A. Santos, the Chief of ICAITI's Budget and Cost Control Division. The purpose of our visit was to determine the adequacy of ICAITI's overall accounting system and verify that costs applicable to ROCAP's project can be readily identified within the system.

ICAITI's accounting system accounts for all transactions on a project-by-project basis. The system generally accounts for all divisional costs by project and by cost element within each project. The transfer of Technology Project is being accounted for under the Special Projects Division because, during total project life, all divisions within ICAITI will most likely participate in the implementation of the project.

All costs charged to the project are recorded on subsidiary project ledger cards which are set up by cost element i.e., personal services, materials and supplies, other direct costs, indirect costs, etc. Exhibit A shows a breakdown of all costs through 12/31/76 by month and cost element.

Our review of costs incurred by ICAITI and billed to ROCAP through December 31, 1976, disclosed that all direct costs, with the exception of entertainment, are being charged to ROCAP and all indirect costs, (70% of Direct Salaries), are being covered by ICAITI as their counterpart contribution.

The accounting by ICAITI on costs charged to ROCAP was generally found to be adequate. There are however, several problem areas. These are as follows:

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

A. Filing System - ICAITI does not maintain separate files of supporting documentation for costs charged to ROCAP. While this isn't a major problem now it could lead to difficulties later on if ROCAP's document retention requirements differ from ICAITI's.

B. Employee Benefits - Personal Services costs, in addition to including those salaries for the three Field Representatives, include salary portions of all ICAITI personnel who have worked on the project at one time or another. These costs are being allocated based on Time and Attendance reports presented by the employee (see Exhibit B). The salary portion is increased by 36% to cover employee benefits, such as vacations, pensions, medical and accident insurance, Christamas bonuses, income taxes, severance payments, etc.

C. Contract Approval - Personal services contracts for Field Representatives should be reviewed and approved by ROCAP in writing prior to being signed by ICAITI.

D. Duplicate Payment - The reimbursement request submitted to ROCAP for charges incurred by ICAITI through December 31, 1976, included a duplicate salary payment made to Mr. Jaime Gonzalez in the amount of $209.78.

Corrective action on the aforementioned problem areas should be taken as follows:

A. Separate files should be established and maintained by ICAITI of all supporting documentation for all charges billed to ROCAP. This will prevent future problems should there be a difference between AID's and ICAITI's record retention policies.

B. Since Pro-Ag 76-9, Annex B, "Administrative and Fiscal Provisions," prohibits the use of funds provided by ROCAP for payment of any employee benefits, a legal determination (in writing) should be made as to the allowability of the 36% being charged by ICAITI to cover these benefits. Put very simply, the USG is reimbursing ICAITI for costs it hasn't incurred and in some cases, e.g. severance payments, may never incur.

C. A copy of all contracts executed by ICAITI and funded under this project should be provided to the POCAP Controller's Office for review and approval prior to signing.

D. ICAITI should deduct $209.78 from their next reimbursement voucher since they received a duplicate payment for Mr. Gonzalez's salary.

The above comments result from a limited review of documentation supporting ICAITI's first reimbursement request and a brief examination of ICAITI's accounting system.

If we may provide further assistance to you in this or related matters please contact this office.

cc: Mr. Fullmer

Rl:cdl

Exhibit A

I C A I T I
TRANSFER OF TECHNOLOGY
BREAKDOWN OF COSTS THROUGH DECEMBER 31, 1976

	Cost Category				
onth	Personal Services	Materials & Supplies	Direct Costs	Indirect Cost	Total
une	139.89	-----	-----	97.92	237.81
uly	494.55	-----	-----	346.19	840.74
ug.	738.83	4.67	91.00	517.18	1,351.68
ept.	4,959.94	5.87	281.64	3,471.96	8,719.41
ct.	6,358.92	5.30	110.14	1,808.99	8,283.35
ov.	2,404.15	8.14	479.98	807.90	3,700.17
ec.	6,780.81	17.33	1,285.48	7,371.56	15,455.18
Total	21,877.09	41.31	2,248.24	14,421.70	38,588.34

COST ELEMENTS AND SOURCE OF FUNDING

		ROCAP	ICAITI
Personal Services			
Direct Salaries		$20,602.44	$ ---
Technical Personnel		1,274.65	---
	Total	$21,877.09	$ ---
Materials and Supplies			
Office		$ 10.80	$ ---
Other		30.51	---
	Total	$ 41.31	$ ---
Other Direct Costs			
Travel and Per Diem		$ 1,897.26	$ ---
Telephone and Cables		252.78	---
Entertainment		---	98.20
	Total	$ 2,150.01	$ 98.20
Indirect Costs		$ ---	$ 14,421.70
	Total	$24,068.44	$ 14,519.90

RL:cdl

ATTACHMENT E

IDENTIFICACION Y SELECCION DE RAMAS INDUSTRIALES PRIORITARIAS PARA EL PROGRAMA DE TRANSFERENCIA DE TECNOLOGIA

ANTECEDENTES

Con fecha 28 de mayo de 1976, la Oficina Regional para Programas Centroamericanos (ROCAP), de la Agencia para el Desarrollo Internacional (AID) de los Estados Unidos, y el Instituto Centroamericano de Investigación y Tecnología Industrial (ICAITI), convinieron en que este último se encargaría de establecer un mecanismo de transferencia de tecnología (Programa para la Transferencia de Tecnología, PTT) que tuviese la capacidad de iniciar y mantener un intercambio de información y tecnología entre fuentes extranjeras y consumidores centroamericanos.

Dentro de los términos del convenio se especifica que al inicio del programa, el ICAITI, a través de la División de Servicios Técnico-Industriales, con la asistencia de consultores y con la colaboración de los representantes de campo del ICAITI dentro del PTT, se encargaría de realizar un análisis del sector industrial centroamericano con el objeto de identificar y seleccionar un número limitado de ramas industriales para los servicios del PTT.

Para la identificación y selección de las ramas prioritarias, en la primera reunión del grupo de consultores al programa, llevada a cabo en la sede del ICAITI en el mes de agosto, se preparó una lista preliminar de doce criterios de selección como orientación al grupo de trabajo.

Con base en los referidos criterios, las ramas industriales fueron clasificadas conforme a un orden de prioridad que se considera refleja la sucesión en la que ofrecen las mayores oportunidades para una transferencia de tecnología en Centroamérica.

Las ramas industriales así clasificadas y la metodología empleada para su selección, se ofrecen en el presente documento.

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INTRODUCCION

Dentro de las actividades contempladas al inicio del programa de transferencia de tecnología, se encuentra el desarrollo de un análisis del sector industrial centroamericano, con miras a la identificación y selección de un número limitado de ramas industriales prioritarias para el programa.

Dicha selección se consideró necesaria teniendo en cuenta que el PTT es un programa prototipo cuya factibilidad se evaluará en el período relativamente corto de 18 meses y, dada la amplitud y la complejidad que caracteriza al sector industrial, para evitar correr el riesgo de diluir el impacto del programa que indudablemente resultaría de tratar de cubrir la totalidad del sector, sería necesario y conveniente canalizar los esfuerzos hacia las ramas industriales más importantes y que presenten las mejores oportunidades para una transferencia de tecnología.

Por otra parte y en este mismo orden de ideas, la selección se consideró deseable teniendo en cuenta también que el ICAITI tiene mayor experiencia en unas ramas industriales más que en otras y, por lo tanto, sería mucho más estratégico circunscribir el radio de acción del programa en aquellas áreas en donde hay más capacidad de servicio y en el que se tiene a la disposición el personal y equipo necesarios para resolver con más eficiencia los casos de transferencia de tecnología que se presenten.

Lo anterior, sin embargo, no significa que el programa excluirá totalmente ciertas ramas. Esto conllevará el peligro de que el programa, y por ende el ICAITI, podría llegar a tener una reputación discriminativa. Por lo tanto, las ramas industriales fueron clasificadas conforme a un orden de prioridades. Las de más alta prioridad serían las que activamente trabajarían los representantes de campo. Sin embargo, cualquier solicitud que hiciera un cliente dentro de las ramas de menor prioridad será procesada con la misma rapidez y eficiencia de las primeras.

Otro de los aspectos considerados en el análisis del sector industrial centroamericano para la identificación y selección de ramas prioritarias se refiere al nivel de desglose de las ramas a que se desee llegar, si a las grandes ramas (industria de productos alimenticios) o a una división de éstas (fabricación de productos lácteos) o aun a una mayor subdivisión (producción de quesos). Desde todo punto de vista, lo ideal hubiera sido lograr el mayor grado de detalle posible. Desafortunadamente, la información disponible para el análisis del sector, en su mayor parte, se encuentra tabulada al nivel de las grandes ramas, conforme a la Clasificación Industrial Internacional Uniforme (CIIU) de las Naciones Unidas. Como consecuencia, en el presente trabajo las ramas se presentan ordenadas de acuerdo a esta clasificación y dentro de cada una de estas ramas se identifican los sub-sectores prioritarios con base en una encuesta entre los jefes de división del Instituto.

IDENTIFICACION Y SELECCION DE RAMAS INDUSTRIALES

1. Fuentes de Información

Para la identificación y selección de las ramas industriales prioritarias se recabó y consultó una serie de informaciones sobre la industria centroamericana de diferentes fuentes, tanto de tipo cualitativo como cuantitativo.

Las fuentes de información fueron muy variadas, correspondiendo en algunos casos a estadísticas de tres años atrás, siendo los anuarios de comercio exterior el caso extremo, ya que los datos publicados más recientes corresponden al año 1971. Por otra parte, no toda la información era del mismo año para todos los países.

A pesar de lo anterior, se considerá que la información disponible fue lo suficientemente confiable y representativa para los propósitos de identificación y selección de las áreas prioritarias del sector industrial centroamericano.

Fueron consultados y analizados datos estadísticos centroamericanos relacionados con las importaciones y exportaciones por rama industrial, estadísticas de empleo, valor de la producción e inversión por rama industrial.

Asimismo, se efectuó una investigación de la oferta y la demanda de servicios técnicos del ICAITI, con base en las actividades desarrolladas en años recientes, de acuerdo a la capacidad técnica y aptitudes del Instituto, así como conforme a las solicitudes de asistencia que ha recibido el ICAITI durante los últimos años.

A continuación se enumeran algunos de los criterios y las fuentes de información que fueron empleados para obtener los indicadores de la prioridad por criterio y por rama:

Criterio	Fuente
1. Substitución de importaciones	Estadísticas de importación regional 1968/1971

	Criterio	Fuente
2.	Potencial para exportación	Estadísticas de exportación regional 1968/1971
3.	Capacidad existente en el ICAITI	Trabajos hechos por cada División del ICAITI, clasificados por rama industrial
4.	Prioridades nacionales	Planes nacionales de desarrollo
5.	Industrias sensitivas	Conocimiento general de las áreas sensitivas existentes en Centroamérica
6.	Importancia presente	Estadísticas de empleo, valor de la producción, inversión por rama. Publicaciones de los Ministerios de Economía
7.	Capacidad financiera para absorber tecnología	Publicaciones estadísticas sobre número de empleos e inversión fija por empresa y por rama industrial
8.	Desarrollo de recursos naturales	Datos cualitativos sobre desarrollo de industrias intermedias
9.	Contactos existentes en el ICAITI	Registros del ICAITI de las investigaciones realizadas y consultas de clientes
10.	Capacidad para absorber tecnología	Información cualitativa basada en los contactos pasados y presentes del ICAITI

2. Criterios para la Selección de Ramas Prioritarias

Los doce criterios que fueron propuestos en la primera reunión del grupo de consultores al progrma fueron analizados y evaluados en función de la aplicabilidad de los mismos criterios de selección. También fueron analizados desde el punto de vista de la disponibilidad y adecuacidad de la información con que las ramas podrían ser ordenadas conforme a cada uno de los criterios.

En la evaluación de los mismos se apreció un grado relativo de traslape entre algunos criterios que tendería a una sobrevaloración, lo que llevó a considerar la conveniencia de agrupar los criterios bajo cuatro categorías.

Con esta clasificación, el riesgo de sobrevalorar ciertos criterios prácticamente desapareció. Por otra parte, esta categorización permite una comparación directa entre las dos primeras que representan la importancia político-económica del sector y las dos últimas que denotan la efectividad potencial del programa de transferencia de tecnología. Es así como los pesos relativos que se asignan a las Categorías I y II, comparados con los de las Categorías III y IV, es indicativo de la importancia del sector v.s. la de la efectividad del proyecto, ambos de importancia para el éxito del programa.

De la lista de criterios para hacer la selección de prioridades fueron eliminados dos, el que se refiere a la propiedad, tamaño e historia de las empresas de la rama, y el de la capacidad de los agentes de campo.

La razón que se tuvo fue la falta de información estadística adecuada y el hecho de involucrar en el segundo una elevada dosis de apreciación personal para clasificarla por ramas industriales.

Las cuatro categorías quedaron integradas, con sus criterios correspondientes, de la manera siguiente:

I. IMPORTANCIA NACIONAL O REGIONAL DE LA RAMA

A. Prioridad nacional

B. Potencial para el desarrollo de recursos naturales

II. IMPORTANCIA ECONOMICA DEL SECTOR

A. Importancia presente (basada en el número de empleados, valor de la producción y tamaño de la inversión)

B. Potencial para sustituir importaciones

C. Potencial para la exportación

III. CAPACIDAD Y DISPOSICION DEL SECTOR PARA ACEPTAR EL PTT

A. Capacidad financiera de las empresas para pagar la tecnología

B. Capacidad técnica de las empresas para absorber tecnología

IV. HABILIDAD DEL ICAITI PARA SUMINISTRAR ASISTENCIA TECNICA

A. Capacidad existente en el ICAITI

B. Contactos del ICAITI con las empresas

3. <u>Selección y Ordenamiento de Ramas Prioritarias</u>

Para determinar las ramas prioritarias en qué hacer énfasis con el programa de transferencia de tecnología, fue necesario establecer la mayor o menor importancia que tendría cada una de las cuatro categorías en la selección de las ramas. Esto se logró por medio de la apreciación de los jefes de las divisiones del ICAITI: Servicios Técnico-Industriales;

Análisis, Pruebas y Ensayos; Investigación Aplicada, y Documentación e Información. En cada caso fue asignado un peso a las categorías, el que fue consolidado en uno solo.

Las apreciaciones de los cuatro jefes divisionales coincidieron en que el éxito del programa reside, no tanto en los aspectos político-económico de la rama seleccionada, como en la capacidad y disposición de la misma a aceptar el PTT y la capacidad del ICAITI para suministrar la asistencia requerida. Establecieron los siguientes pesos para cada categoría:

		Peso
I.	Importancia nacional o regional	56.6
II.	Importancia económica	53.2
III.	Capacidad y disposición de la rama para aceptar el PTT	100.0
IV.	Habilidad del ICAITI para suministrar asistencia técnica	93.3

La información estadística sobre la industria centroamericana permitió establecer la importancia o la participación porcentual de cada rama dentro del sector industrial y para cada uno de los criterios.

En el caso de los criterios con aspectos cualitativos, para obtener la importancia relativa de las ramas industriales se hizo uso de una escala de valoración asignándole el 100 por ciento a las ramas que estaban consideradas dentro del criterio y 0 por ciento cuando fueran ajenas al criterio. Así, por ejemplo, si una rama fue considerada en los planes nacionales de desarrollo económico como prioritaria, recibió un porcentaje del 100 por ciento, y todas las demás un 0 por ciento.

Con las ramas industriales y con las cuatro categorías seleccionadas se formó una matriz para clasificar las ramas industriales.

En la matriz de selección, cada rama industrial tiene un porcentaje determinado con relación a cada criterio. Este porcentaje se multiplicó por el peso promedio que cada criterio tiene según la evaluación realizada por los jefes de las divisiones del ICAITI y el resultado es el producto que sumado horizontalmente y dividido entre cuatro, dio al final un porcentaje ponderado promedio cuya magnitud señala el orden de importancia de las ramas industriales como resultado de la evaluación final.

Las ramas industriales que resultaron en los primeros seis lugares de la escala fueron: productos alimenticios, productos químicos, derivados del petróleo, calzado y vestuario, papel y cartón, y productos metálicos.

Un análisis de estos resultados de la evaluación condujo a eliminar de la lista la rama de derivados del petróleo. La eliminación se debió a que las empresas que integran esa rama son en su mayoría firmas extranjeras transnacionales, con una alta tecnología, con una gran intensidad de capital, y un reducido número de plantas.

Su clasificación fue extremadamente baja en la Categoría IV, logrando tan sólo una puntuación del 0.2 por ciento. La única razón de su alta colocación se debió a su clasificación en la Categoría III, con base en su elevada relación "inversión por planta" e "inversión por personal ocupado", criterios estos seleccionados para medir la capacidad técnica y financiera para absorber y pagar tecnologías.

Por otra parte, la alta clasificación de la rama "Derivados del petróleo" se encuentra distorsionada por las refinerías de petróleo, que reciben su asistencia técnica de la casa matriz y es muy dudoso que lleguen a ser clientes del programa de transferencia de tecnología.

MATRIZ DE SELECCION DE RAMAS INDUSTRIALES

Sectores	Criterio I		Criterio II		Criterio III		Criterio IV		Rama		Ordenamiento
	%	Porcentaje ponderado	%	Porcentaje ponderado	%	Porcentaje ponderado	%	Porcentaje ponderado	%	Porcentaje ponderado	
20 Productos alimenticios	5.6	2.4	35.7	19.8	35.3	35.4	38.8	30.3	28.8	87.9	1
21 Bebidas	-	-	2.3	1.5	2.1	2.1	0.2	0.1	1.2	3.7	13
22 Tabaco	-	-	0.9	0.6	1.3	1.1	0.0	-	0.6	1.7	19
23 Textiles	12.7	7.4	6.7	4.0	2.7	2.6	10.2	11.3	8.1	25.3	4
24 Calzado y vestuario	5.6	2.4	2.9	1.8	0.3	0.3	-	-	2.2	4.5	12
25 Madera	12.7	7.4	5.4	2.9	0.3	0.2	0.9	0.5	4.8	11.0	9
26 Muebles	5.6	2.4	0.8	0.5	0.3	0.3	0.5	0.4	1.8	3.6	15
27 Papel y cartón	7.1	5.0	2.8	1.3	1.6	1.6	10.8	11.6	5.6	19.5	5
28 Imprentas	-	-	0.9	0.6	0.8	0.8	0.4	0.3	0.5	1.7	20
29 Cuero y productos	5.6	2.4	0.4	0.2	0.9	0.9	8.6	10.2	3.9	13.7	7
30 Caucho	-	-	1.4	0.7	1.9	1.9	-	-	0.8	2.6	17
31 Productos químicos	12.7	7.4	11.9	5.8	11.2	11.7	15.5	14.8	12.8	39.7	2
32 Derivados del petróleo	7.1	5.0	2.8	1.5	32.2	32.0	0.3	0.2	10.6	38.7	3
33 Productos minerales no metálicos	12.7	7.4	2.4	1.5	2.8	2.9	1.4	1.0	4.8	12.8	8
34 Metales básicos	7.1	5.0	2.3	1.1	1.3	1.3	-	-	2.7	7.4	10
35 Productos metálicos	5.6	2.4	3.2	1.7	1.0	0.9	9.6	10.8	4.8	15.8	6
36 Maquinaria, excepto eléctrica	-	-	6.1	2.6	0.5	0.5	0.9	0.6	1.9	3.7	14
37 Maquinaria, aparatos y accesorios eléctricos	-	-	3.2	1.5	0.5	0.5	-	-	0.9	2.0	18
38 Equipo de transporte	-	-	4.8	2.0	0.5	0.5	0.4	0.2	1.4	2.7	16
39 Industrias diversas	-	-	3.3	1.6	2.5	2.5	1.5	1.0	1.8	5.1	11
TOTAL	100.0	56.6	100.0	53.2	100.0	100.0	100.0	93.3	100.0	303.1	

Se efectuó también una modificación a la clasificación de las ramas industriales al agrupar cinco de ellas en una sola. Bajo la denominación "metalmecánica" fueron agrupadas las ramas de productos metálicos: maquinaria, excepto eléctrica, maquinaria, aparatos y accesorios eléctricos, y equipo de transporte. Estas ramas, con baja puntuación individual, al integrarse en una sola, el porcentaje resultante de la evaluación llegó a ser del 41.6 por ciento dentro de la escala, lo que las sitúa en el segundo lugar de importancia. Esto es deseable, toda vez que el ICAITI tiene especial preferencia y capacidad para transferir tecnología en esta área de actividad.

La selección final de las ramas prioritarias y el valor final según la evaluación anterior, quedó de la siguiente manera:

Número de Orden	Puntos	Rama
1	87.9	Productos alimenticios
2	41.6	Metalmecánica
3	39.7	Productos químicos
4	25.3	Textiles
5	19.5	Papel y cartón
6	13.7	Cuero y productos

4. Actividades Elegidas de las Ramas Prioritarias

Teniendo en cuenta la conveniencia para el programa de una subdivisión de las ramas seleccionadas, la naturaleza multidisciplinaria del Instituto y el interés y capacidad en áreas específicas de las diferentes divisiones, se llevó a cabo una encuesta entre los jefes de división para conocer

sus preferencias de las actividades de las ramas industriales prioritarias.

En el siguiente cuadro se señalan, con una X, las actividades que las diferentes divisiones no quieren que los representantes tomen en cuenta por no contar con los recursos técnicos necesarios para dar asistencia en ese campo. Sin embargo, y tal como se indicó con anterioridad, cualquier consulta proveniente de estas actividades será atendida con rapidez y en la mejor forma posible.

Actividades de las Ramas Industriales Prioritarias

		IA	STI	DI	APE
1.	Productos alimenticios				
1.1	Matanza de ganado y preparación y conservación de carne				
1.2	Fabricación de productos lácteos				
1.3	Envasado y conservación de frutas y legumbres				
1.4	Elaboración de pescado, crustáceos y otros productos marinos				
1.5	Fabricación de aceites y grasas vegetales y animales				
1.6	Productos de molinería				
1.7	Fabricación de productos de panadería				

		IA	STI	DI	APE
1.8	Fábricas y refinerías de azúcar				
1.9	Fabricación de cacao, chocolate y artículos de confitería				
1.10	Elaboración de productos alimenticios diversos				
1.11	Elaboración de alimentos preparados para animales				
2.	Textiles				
2.1	Hilado, tejido y acabado de textiles	X			
2.2	Artículos confeccionados de materiales textiles excepto prendas de vestir	X			
2.3	Fábricas de tejido de punto	X			
2.4	Fabricación de tapices y alfombras	X	X		
2.5	Cordelería	X	X		
2.6	Fabricación de textiles n.e.p.	X	X		
3.	Industria del cuero y productos de cuero				
3.1	Curtidurías y talleres de acabado	X	X		
3.2	Industria de la preparación y teñido de pieles	X	X		

		IA	STI	DI	APE
3.3	Fabricación de productos de cuero y sucedáneos, excepto calzado y otras prendas de vestir	X			
3.4	Fabricación de calzado, excepto el de caucho vulcanizado o moldeado de plástico	X			
4.	Fabricación de papel y productos de papel				
4.1	Fabricación de pulpa de madera, papel y cartón			X	X
4.2	Fabricación de envases y cajas de papel y cartón			X	X
4.3	Fabricación de artículos de pulpa, papel y cartón, n.e.p.			X	X
5.	Fabricación de sustancias químicas				
5.1	Fabricación de sustancias químicas industriales básicas, excepto abonos				
5.2	Fabricación de abonos y plaguicidas				
5.3	Fabricación de resinas sintéticas, materias plásticas y fibras artificiales, excepto el vidrio				
5.4	Fabricación de pinturas, barnices y lacas				

		IA	STI	DI	APE
5.5	Fabricación de productos farmacéuticos y medicamentos				
5.6	Fabricación de jabones, preparados de limpieza, perfumes, cosméticos y otros productos de tocador				
5.7	Fabricación de productos químicos n.e.p.				
6.	Industrias metálicas básicas				
6.1	Industrias básicas de hierro y acero	X			X
6.2	Industrias básicas de metales no ferrosos	X			X
7.	Fabricación de productos metálicos, maquinaria y equipo				
7.1	Fabricación de productos metálicos, exceptuando maquinaria y equipo	X			X
7.2	Construcción de maquinaria, exceptuando la eléctrica				X
7.3	Construcción de maquinaria, aparatos, accesorios y suministros eléctricos	X			X
7.4	Construcción de material de transporte	X			X

		IA	STI	DI	APE
7.5	Fabricación de equipo profesional y científico, instrumentos de medida y de control, n.e.p. y de aparatos fotográficos e instrumentos de óptica		X		X

IA Investigación Aplicada
STI Servicios Técnico-Industriales
DI División de Información
APE Análisis, Pruebas y Ensayos

RESUMEN DE ACTIVIDADES DEL PTT DE ENERO A ABRIL 1977

		Contactos de Trabajo												Acción Tomada			
			Industria			Instituc.		Requerimiento									
País	Visitas di vulg PTT	Total	Peq	Med	Gde	Est.	Priv.	Inf.	a.t.	Serv.	no	Term.	En proceso	Pend. acept.	Prop no acept.	Prop en prep.	Sin req.
ENERO																	
Total	23	17	3	7	1	6	-	8	3	2	4	8	-	4	1	-	4
Gua	5	11	3	7	1	-	-	2	3	2	4	2	-	4	1	-	4
Sal	18	6	-	-	-	6	-	6	-	-	-	6	-	-	-	-	-
Hond	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C.Rica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FEBRERO																	
Total	12	19	-	9	1	9	-	13	2	1	3	11	3	2	-	-	3
Gua	-	5	-	4	1	-	-	1	-	1	3	-	2	-	-	-	3
Sal	-	10	-	1	-	9	-	10	-	-	-	10	-	-	-	-	-
Hond	6	2	-	2	-	-	-	-	2	-	-	-	-	2	-	-	-
Nic	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C.Rica	2	2	-	2	-	-	-	2	-	-	-	1	1	-	-	-	-
MARZO																	
Total	12	36	4	29	3	-	-	20	1	7	8	14	6	3	1	4	8
Gua	3	10	-	10	-	-	-	6	-	1	3	5	-	2	-	-	3
Sal		14	-	11	3	-	-	8	1	3	2	4	4	-	-	4	2
Hond	4	4	1	3	-	-	-	3	-	1	-	2	-	1	1	-	-
Nic.		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C.Rica	5	8	3	5	-	-	-	3	-	2	3	3	2	-	-		3

RESUMEN DE ACTIVIDADES DEL PTT DE ENERO A ABRIL 1977

Continuación

		Contactos de Trabajo						Requerimiento				Acción Tomada					
			Industria			Instituc.											
País	Visitas di vulg. PTT	Total	Peq.	Med.	Gde.	Est.	Priv.	Inf.	a.t.	Serv.	no	Term.	En proceso	Pend. acept.	Prop no acept.	Prop en prep.	Sin req.
ABRIL																	
Total	-	25	6	13	2	2	2	13	5	1	6	12	-	-	-	7	6
Gua	-	5	-	4	1	-	-	4	-	-	1	4	-	-	-	-	1
Sal	-	10	4	2	1	1	2	6	1	-	3	6	-	-	-	1	3
Hond	-	9	2	6	-	1	-	2	4	1	2	2	-	-	-	5	2
Nic	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
C. Rica	-	1	-	1	-	-	-	1	-	-	-	-	-	-	-	1	-
RESUMEN AL 30 DE ABRIL DE 1977																	
TOTAL	47	97	13	58	7	17	2	56	9	11	21	45	9	9	2	11	21
Gua	8	31	3	25	3	-	-	13	3	4	11	11	2	6	1	-	11
Sal	18	40	4	14	4	16	2	30	2	3	5	26	4	-	-	5	5
Hond	10	15	3	11	-	1	-	7	4	2	2	4	-	3	1	5	2
Nic	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. Rica	7	11	3	8	-	-	-	6	-	2	3	4	3	-	-	1	3

Est. = Estatal
Priv. = Privada
Inf. = Información
a.t. = Asistencia Técnica
Serv. = Servicios
no = No hubo requerimiento

Term = Terminada
Pend. Acept. = Pendiente de aceptación
Prop. no acept. = Propuesta no aceptada
Prop. en prep. = Propuesta en preparación
Sin req. = Sin requerimiento