

COMMUNICATION FOR TECHNOLOGY TRANSFER IN AGRICULTURE PROJECT
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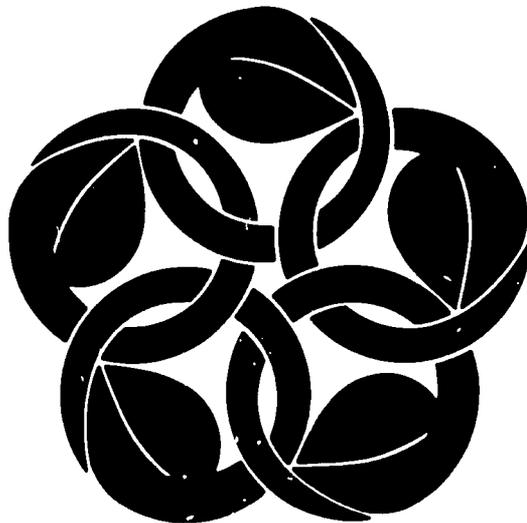
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Midterm Evaluation

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List of Acronyms

ACT	Applied Communication Technology
AED	Academy for Educational Development
A.I.D.	U.S. Agency for International Development
AID/H	AID/Honduras
AID/P	AID/Peru
AID/W	AID/Washington
ANE	Asia and Near East Bureau (of AID)
ATT	Agricultural Technology Development and Transfer Project (Peru)
CEDIA	Documentation and Agricultural Information Center (Honduras)
CIDA	Canadian International Development Agency
CTTA	Communications for Technology Transfer in Agriculture Project
DAC	Department of Agricultural Communications (Honduras)
FHIA	Honduran Foundation for Agricultural Research
FUNDEAGRO	Foundation for Agricultural Development (Peru)
GOH	Government of Honduras
GOP	Government of Peru
IICA	Instituto Interamericano de Cooperacion para Agricultura
INIAA	National Institute for Agricultural and Agroindustrial Research (Peru)
INIPA	Instituto Nacional de Investigacion y Promocion Agropecuaria (former name of INIAA)
MOA	Ministry of Agriculture (Peru)
NCSU/MIAC	North Carolina State University/Midamerica International Agricultural Consortium
PIO/T	Project Implementation Order/Technical
PP	Project Paper
PPC/CDIE	Bureau for Program and Policy Coordination/Center for Development Information and Evaluation
RD&E	Research, Development, and Extension
ROCAP	Regional Office for Central America and Panama (of AID)
SNR	Secretariat for Natural Resources (Honduras)
S&T	Science and Technology Bureau (of AID)
S&T/AG	S&T Agriculture Office
S&T/ED	S&T Education Office
S&T/HR	S&T Human Resources Office
S&T/FN	S&T Food and Nutrition Office
S&T/EN	S&T Energy and Natural Resources Office
S&T/RD	S&T Rural and Institutional Development Office
TT	Technology Transfer
T&V	Training and Visit System of Extension

Executive Summary

The U.S. Agency for International Development (A.I.D.) has a long history of investment in technology transfer (TT) in support of agricultural research, development, and extension (RD&E). Historically, however, such efforts with national RD&E institutions have been disappointing, for a host of reasons. Primary among these are misguided attempts at wholesale superposition of Western-world TT models upon alien, developing-country (DC) contexts to which they are insensitive.

Well-known problems in conventional TT in such milieu include: poor linkages between research and extension institutions; highly centralized, politicized, and top-heavy RD&E bureaucracies; shortfalls in competent research and extension personpower, and a dearth of mechanisms to develop, advance, and retain such personnel; relatedly, generally inadequate financial, managerial, and logistic support for the agricultural RD&E system; poor organization and targeting of such RD&E resources as do exist to serve farmers' real needs; hence a lack of appropriate agricultural technology to extend; and in the project arena, overly complex and ambitious project designs coupled with sharp constraints on DC resources to support such projects. In addition, many countries (e.g. Honduras, Peru) are plagued with political instability or uncertainty and eroding economies. Experienced readers could add still more to this discouraging list.

In 1985, the Communications for Technology Transfer (CTTA) project was jointly designed and funded by three A.I.D./S&T offices (AG, ED, and HR) as a departure from conventional A.I.D. investments in extension. This project adopts a more bottom-up, context-sensitive approach and features an innovative but inexpensive communications component that applies principles of social marketing and modern information science to the design and diffusion of agricultural technology. Implemented with the Academy for Educational Development (AED) as prime contractor, the aim of this experimental project is to test an alternative TT approach that can address many of the foregoing problems.

The present document reports findings from a midterm evaluation of the CTTA project in Honduras and Peru -- the two countries in which it has been fully implemented. The evaluation had two principal goals: to assess progress to date in developing, demonstrating, and institutionalizing the CTTA approach; and in light of lessons learned from the CTTA experiment, to consider future A.I.D. directions in mounting viable technology transfer activities.

The CTTA Project

CTTA is not a conventional communications project any more than it is a conventional technology transfer project. Rather, it constitutes a test of an integrated TT process that -- by folding a creative communications component into RD&E systems and by building upon existing resources, however modest -- serves to increase:

- farmers' active participation in technology generation, adaptation, and transfer;
- researchers' ability to design appropriate agricultural technology for DC producers; and

- extensionists' effectiveness in transferring this technology to their clients.

The CTTA process spans: developmental/diagnostic investigation of a targeted region; based on developmental findings, prioritization of communities, commodities, and agricultural needs to be addressed; identification of appropriate "shelf" technologies (or if none exist, of fresh directions for technology generation); localized validation of technologies to be transferred; design of a culturally contextualized but unified transfer strategy using elements of both communication science and conventional extension; formative evaluation of the strategy design -- i.e., validation of TT media and messages with farmer "consumers" -- and redesign as indicated; and finally, continuous feedback from farmers and extensionists to researchers and extension administrators, as agronomic, climatic, market, or other conditions shift, and with them, producer needs.

Farmer participation is a "given" in all parts of the process -- through surveys, in-depth interviews, focus groups, on-site farmer- or cooperative-managed trials, and monitoring of client subsamples to determine the degree to which extension messages have been received, understood, and correctly acted upon.

As an experimental project, CTTA also includes a "summative evaluation" to objectively measure its enhancement of:

- participant "attitudes," e.g. farmers' perceptions of RD&E capability and relevance, researchers' appreciation of farmers' problems and constraints, and extensionists' job motivation and self-esteem;
- transfer of technical/professional knowledge and skills among all these groups;
- farm yields, productivity, and income; and
- national institutional ability to organize, implement, and manage the CTTA process.

Midterm Evaluation Findings

Given the long history of disappointing public-sector TT efforts, the midterm evaluation team understandably approached its task with a healthy skepticism. But strikingly favorable qualitative findings transformed this skepticism into optimism. The strong points of the CTTA approach can be summarized as follows.

1. It integrates agricultural researchers, extensionists, and farmer clients into a cohesive TT "team." This appears to result from various factors. There is increased dialogue among all these "players" in the RD&E system. Of particular importance is high farmer participation in the developmental, validation, and formative stages of the CTTA process. This ensures that RD&E activities are very client-group-sensitive, responding to concrete agricultural needs in the

context of clients' current farming systems, technical knowledge, and socioeconomic realities.

2. Equally important is the fact that -- while many components in the CTTA process are not really new -- the approach takes previously uncoordinated RD&E activities and resource-allocation decision-making and places them in an orderly, efficient sequence. This enhances planning and targeting for both research and extension, and the reasoned use of scarce human, financial, vehicular, and etc. resources. In particular, the approach makes for more disciplined and realistic extension work plans.
3. A corollary of the foregoing is a marked improvement in extensionists' self-confidence, motivation, and job performance. They attribute this attitudinal change in part to the effectiveness of CTTA broadcast and print media. As one interviewee noted, "Before, we went to the...countryside empty-handed. The only materials we had to work with were ourselves." Extensionists also applaud the problem-centered and systematic planning that the CTTA approach engenders. The remarks of one interviewee are representative of many others: "Now I know that any work I do will have an impact. Why? Because I know it responds to a real need."
4. Improved extension performance has translated into increased farmer appreciation of and confidence in extensionists. More broadly, this has changed farmers' image of their government's commitment to its rural citizenry. "Before this," said one group of participating farmers, "we thought our government was deaf."
5. The CTTA process promotes knowledge transfer among all participants. As both survey and other data attest, the process appears especially effective in delivering technical and/or managerial training to farmers and/or extension agents and leaders. Interestingly, the latter note that CTTA-designed media are just as useful for training extensionists or refreshing agents' skills as they are for imparting information to farmer clients.
6. Because of its built-in feedback mechanisms, the CTTA process allows for rapid adjustments in RD&E to deal with shifting conditions (e.g., fluctuations in the price of agricultural inputs and outputs, pest and disease attacks on crops, etc.)
7. The multi-media strategies of the CTTA process mean that agricultural information reaches many more farmers than conventional TT methods. Extension leaders in Peru estimate that, in contrast to training and visit (T&V) methods -- which cover only 5% to 10% of their target population -- CTTA approaches reach 30% to 40%. This includes many more remote farmers who can thus receive information year-round instead of, e.g., just during the dry season or only when rebel activity is suspended. Moreover, the media are readily adaptable to speakers of different languages.

8. Qualitative findings suggest that the CTTA process ultimately increases agricultural yields and product quality/value and hence farm income.
9. Finally, in Honduras at least, the CTTA process has made great strides toward institutionalization. In part, this relates to its emphasis on the rational use of existing resources, supplementing these with very modest operational and communications inputs. The Honduran Secretariat of Natural Resources (SNR) has officially adopted the CTTA approach to all its technology transfer operations. In Peru, although CTTA has received much praise and attention, institutionalization has been slowed by later project start-up, recurrent funding problems, acute political unrest, spiraling inflation, confused institutional responsibilities, and other factors.

While the conceptual and processual strengths of the CTTA approach are many, the midterm evaluation revealed several problems and shortcomings associated primarily with the funding and administration of the project.

10. CTTA funding was initially scheduled at \$19.5 million. Between the project paper and implementation phases, however, this figure shrank dramatically. Over the period 1985-1989, budget reductions amounted to approximately 60% to 65%. The \$7.4 million now obligated through June 1990 represents only 36% of the amount originally budgeted. Of this \$7.4, after all current commitments are taken into account, only approximately \$336,000 remains in the central pipeline for the remainder of the project, including all summative evaluation costs and all home-office expenses.
11. Funding from mission buy-ins to CTTA has also been less than anticipated, for several possible reasons. To missions not well-informed of the full CTTA "process," the project title may have signaled an "old-hat" media orientation to technology transfer. Too, insofar as CTTA is perceived as "just another S&T project," missions may be reluctant to take on the added chore of managing a project in which they feel they have little stake.

A more profound explanation may have to do with missions' weariness and frustration in working with public-sector extension (see below). Given the discouraging track record of TT projects generally, investment in CTTA may be seen by some as a risky mission or career move, especially in an era when public-sector involvement is politically unfashionable.

12. S&T's tripartite managerial and funding structure for the project represents a bold move to administratively unite and intellectually recognize the interrelatedness of what are in reality inseparable elements of agricultural TT. However, ED/AG/RD integration has not always been perfect, due to a variety of factors: multiple stakeholders and hence added bureaucratic procedures that inevitably slow decision-making; frequent staff turnovers; and the understandably different interests of each office in experimental outputs.

13. There have been turnovers and strains among contractor and subcontractor personnel that have also slowed progress, e.g. in completion of the summative evaluation.
14. To date, as per its initial mandate, CTTA has worked primarily with near-subsistence or subsistence farmers and with public-sector RD&E. Ideally, the project might have involved a wider variety of participants, including not only wealthier and/or more commercially oriented producers but also suppliers and distributors. While the project design can readily accommodate all these groups, funding slashes slowed expansion of the project to incorporate them. And in both Honduras and Peru, public-sector agencies appear to dominate agricultural input markets, thus limiting the number of potential private-sector participants in the TT process.

In consequence, it remains to be seen whether the CTTA process is equally applicable to other client populations that are more intimately involved in the market economy, are better educated, and may require more complicated technologies and extension information. Still, CTTA's success in reaching the supposedly most recalcitrant of producers -- near-subsistence smallholders -- seems to hold forth good promise for transfer of technology to other groups with greater educational, sociopolitical, economic, and ecological resources.

15. CTTA appears to have paid relatively little attention to women as a client group with potentially different agricultural needs and resources from those of men and "families."
16. Due to a variety of both financial and non-financial difficulties, outputs from the summative evaluation have been minimal. There is as yet no formal quantitative analysis of summative measures of project-impelled changes in participant or institutional attitudes and capacities, or in agricultural yields, productivity, or net farm incomes. At the time of the midterm evaluation, all available data on project achievements derived from formative evaluations, qualitative interviews, farmer recall, and other such sources.
17. Critical analysis and documentation on the extent of CTTA institutionalization is also lacking at this time.

Recommendations

Despite the foregoing constraints and caveats, the CTTA approach offers an extremely promising model for workable transfer of agricultural technology in struggling DC's. The evaluation team commends the prime contractor and A.I.D./S&T for their farsightedness in designing and implementing this experiment under difficult financial and host-country conditions.

Because of the narrow pipeline of funds that can be re-budgeted for the final phase of CTTA, recommendations for re-adjustments at this point must be modest.

However, additional effort is warranted because the CTTA experiment appears to be at a key juncture or "payoff point" both with regard to its full validation and its institutionalization. The midterm evaluation recommendations can be broadly summarized as follows, along with suggestions for future carry-on activities by A.I.D./S&T in agricultural technology transfer.

1. The summative evaluation should be re-designed in a scientifically and financially more parsimonious manner and with a clear model of dependent and independent variables, so as to yield the concrete, quantitative data on project achievements that are necessary to definitively validate the experiment.
2. Priority should also be given to thoroughly documenting and disseminating results from the Honduras site, where the CTTA process has been most fully implemented and institutionalized.
3. For Peru, funding alternatives should be sought for an additional year, to allow time for documentation and dissemination as above, and for further training/outreach in and institutionalization of the CTTA process.
4. In these and all other activities, more explicit attention should be paid to the place of and benefits to farm women and female extensionists and trainees.
5. Follow-on project funding should be provided to: further test the CTTA process with a wider variety of client groups in both Honduras and Peru; generate an end-of-project document suitable for broad distribution to those interested in TT issues within the global development community (e.g. the World Bank); and produce an accompanying bilingual videotape to graphically depict the CTTA process.
6. Looking ahead, future activities should also explore: why some missions are enthusiastic about the CTTA concept while others are not; how inter-office S&T commitment to and collaboration in such interdisciplinary projects can be encouraged and streamlined; how the CTTA process could enhance existing investments in farming systems research and extension in Africa; and how to cultivate World Bank interest in blending CTTA components into the heavily top-down and costly T&V system.
7. Yet another critical need is for a comprehensive contrastive analysis of different TT modes in DC's with a focus on descriptive and quantitative evidence of their relative cost-effectiveness and net social as well as individual benefits across varying client groups.

I. Introduction

A. Agricultural Technology Transfer and CTTA

The U.S. Agency for International Development (A.I.D.) has a long history of investment in technology transfer in support of agricultural research, development, and extension (RD&E). In many instances, the weakest link in these investments has been national agricultural extension institutions. Historically, efforts to support these systems in their task of technology transfer (TT) have been largely top-down, paternalistic, and based on "imported" models. Not surprisingly, the outcome has generally been very disappointing. A recent review of A.I.D.'s agricultural technology transfer portfolio identified three such exogenous models (U.S. land grant, British colonial, and Francophone) and numerous problems associated with these and still other approaches (AID/Washington n.d.).

The problems can be summarized as follows: lack of appropriate agricultural technology to extend; poor linkages between the research and extension systems; constraints on host countries' fulfillment of their agreements; overly complex and ambitious project designs; politicization of the extension service; centralized authority and top-heavy bureaucracies; shortfalls in extension personpower that lead to the service's ignoring poorer, more inaccessible, or female farmers; poorly trained extension personnel with urban-based backgrounds; and incompatibility between conventional extension approaches and traditional systems of information acquisition and utilization (*ibid.*). Still other factors include extensionists' low pay and status vis-a-vis researchers; cultural, educational, and other gaps between these two groups; both group's lack of career opportunities; and extensionists' obligation to perform many non-educational functions as ministry representatives to rural areas.

Featuring an innovative communications component and adopting a more bottom-up approach, the Communication for Technology Transfer Project (CTTA) was designed as a sharp departure from conventional A.I.D. investments in extension to test an alternative TT approach that could address some of the foregoing problems. The impetus for the CTTA experiment derived in part from the successful application of social marketing theory and modern communication and information science in non-agricultural arenas like nutrition and health (e.g., the successful transfer of oral rehydration therapy).

The CTTA technology transfer process has been formally tested in Honduras and Peru. The project has also carried out pilot studies in Senegal and Niger, and major TT support activities in Indonesia and Jordan. However, in none of these other sites was the full CTTA process implemented and/or tested. Nor did available resources did not permit the midterm evaluation team to visit these countries. Hence this report is restricted to Honduras and Peru.

1. The CTTA Concept

CTTA's title tends to be misleading. In contrast to conventional notions of the role of communications in agriculture, the CTTA concept embodies an entire process of technology transfer -- one that highlights, but is by no means limited to, an expanded

communications capacity.

A central component of CTTA is indeed "communication" but communication with a lower-case "c" rather than a capital "C". Or put another way, communication versus Communications. Within the agricultural development community, "Communications" projects have commonly been interpreted as centering on high-tech media hardware and production, rather than on an integrated process of knowledge transfer.

In contrast, CTTA's focus is on the process itself and the many different actors and audiences involved, the linkages (or lack thereof) among them, the cultural as well as the technical content of carefully tailored and tested messages, and ultimately the practical outcome for agriculture of effective "communication." While "Communications" denotes the actual media, messages, and strategies designed and deployed by the project, "communication" highlights the much broader action of ongoing, interactive dialogue among all players in the agricultural technology and transfer system: farmers, extensionists, researchers, communicators, input suppliers, and still others.

In broad strokes, the concept behind the CTTA project is, building upon existing resources and realities (however poor these may be), to put communication to work in creative ways so as to increase:

- farmers' active participation in technology generation, adaptation, and transfer;
- researchers' ability to design appropriate agricultural technology for producers in developing nations; and
- extensionists' effectiveness in transferring this technology to farmers.

CTTA's guiding principle is that effective technology design and transfer must begin and end with the farmer. To achieve its goals, CTTA employs an adaptive action model characterized by:

- analysis of farmer needs and feedforward of this information to research and extension to help shape their priorities;
- identification of producers' preferred communication channels for agricultural information, and targeted use of multiple media for transfer of agricultural technology through these channels; and
- ongoing monitoring and evaluation of media effectiveness to ensure a dynamic flow of information from the "bottom-up" (after Scope of Work, Appendix A).

The CTTA process and its outputs are described in detail in Chapter III. Briefly, however, it incorporates the following major components: developmental (i.e. diagnostic) investigation of an agroecological region; based on developmental findings, prioritization of farmers' agricultural needs and problems; iterative prioritization of communities/extension agencies within the region for participation/training in the CTTA

process; identification of a group of technologies most applicable to the prioritized needs and problems; some further, localized validation of these technologies; design of an overall plan for technology transfer, including communications strategies; and finally, implementation of this plan. In addition, there are periodic formative evaluations of how the plan and specific transfer strategies are working; and there is continuous feedback from farmers and extension agents to researchers and extension administrators. These monitoring and feedback features provide for timely adjustments in the TT plan.

As an experimental project, CTTA also includes a "summative evaluation" designed to objectively test its overall impact across at least four dependent or output variables. The summative evaluation seeks to measure changes in: attitudes among farmers and extensionists; farm productivity and income; technological capacity or knowledge of participating farmers and extension agents; and institutional capacity to organize, implement, and manage the CTTA process.

An ultimate project aim is to institutionalize the CTTA process in the two countries where it has been fully implemented and tested. An important project feature in this regard is that it collaborates with existing institutions; it does not create still more public entities. Institutionalization efforts involve transferring a systematic conceptualization of the TT process through training of extension and communication personnel, publicizing the benefits of applying the process, and assisting in some initial capitalization (e.g. for basic radio equipment, mimeograph machines, etc.).

Two additional project design characteristics are salient: how the transfer process accommodates variability, and how it links up with input suppliers. Accommodating variability requires a knowledge of physical differences (micro-climates, soils, etc.) across locations, sociocultural and linguistic differences, and key client-group characteristics such as educational level or risk aversion. The project design can readily accommodate such variability -- whether in identifying appropriate technologies to be transferred in any given context, tailoring communications strategies to specific client groups or needs, or continually evaluating the effectiveness of transfer modes at different sites and TT phases. CTTA has also been designed in such a way that it can readily collaborate with input suppliers.

In sum, CTTA seeks to bring communication and social marketing concepts to bear on enhancing agricultural RD&E. This objective embodies a recognition that while most transfer (extension) systems include some communication components, these components rarely form an integral part of the overall agricultural technology generation and diffusion system.

As the next chapter documents, the CTTA process has a beneficial systematizing effect on critical elements in the agricultural technology system. CTTA furnishes a work plan for extensionists and researchers; it provides mechanisms for ready adjustments to a chosen transfer message or strategy in response to rapidly shifting climatic, economic, political, etc. conditions; and it brings order to the full process of technology development and transfer. Whatever the reasons for the minimal success of other TT models to date, A.I.D. is to be congratulated for the CTTA project, which tests an innovative and integrative new approach to technology transfer.

B. Midterm Evaluation Methodology

Both before and after travel to Honduras and Peru in May 1988, the midterm evaluation team met with A.I.D. Science and Technology Bureau (S&T) and regional bureau representatives in AID/W and with Washington-based CTTA personnel to discuss evaluation foci and the scope of work (Appendix A), and afterwards, evaluation findings and possible next steps for A.I.D..

A special feature of this midterm evaluation was its limited travel time. The three-person team (Appendix A) was able to spend only one week in each country. In Honduras, two team members visited the primary CTTA site at Comayagua as well as two communities served by San Luis extension agencies. The team also met with extensionists from the Olanchito agency, which on its own initiative was adopting the CTTA process in collaboration with project personnel but with funds from non-project resources. Due to A.I.D. travel restrictions in Peru, the team did not visit any of the field sites there. However, it did bring participating Huaraz farmers and extension personnel, plus the leader of the Puno site, to Lima for in-depth interviews.

In addition to visits to and interviews with field personnel, the team conducted many other interviews (Appendix A). In both countries, meetings were held with CTTA personnel, A.I.D. and ministry officials, current and former extension-agency directors, agricultural communication leaders at both field and national levels, scientists and research directors, leaders of programs to develop private extension organizations, and heads of various organizations not directly connected with the project; and specifically in Peru, foundation (FUNDEAGRO) leaders and collaborating NCSU/MIAC colleagues. Exit conferences were held with A.I.D. officials in both Honduras and Peru.

The team was more than well supplied with reading materials. These included pre-project and project papers (PP), CTTA design documents, quarterly reports, formative and summative design papers and raw data, extension materials, and other documents, including some drafted by CTTA personnel specifically for this evaluation at the team's request (see Bibliography).

II. Project Inputs

A. Implementation Chronology

The antecedents of the CTTA project date back to April 1983 when AID/H and the Honduran Secretariat of Natural Resources (SNR) jointly sponsored a three-day seminar on agricultural communications for government agencies involved in technology transfer to farmers. The seminar created considerable interest in the direct participation of communications personnel in the technology transfer process. As a follow-up, in March 1984, Dr. Howard Ray of the Academy for Educational Development (AED) led an AID/H-funded assessment of the state of agricultural communications in Honduras. This assessment led to the establishment of a Department of Agricultural Communications (DAC) in the SNR. An earlier DAC-like organization formed part of the Directorate for Extension. The new DAC, however, reports directly to the Secretary.

Concurrent with these events, Dr. Anthony Meyer of S&T/ED was developing the CTTA project in AID/W. The project was approved in April 1985, and AED was contracted to implement it in September 1985. A project team headed by Dr. Ray then wrote an implementation plan for a pilot effort in Honduras, selected a project site, and negotiated a Letter of Understanding between AID/H and the SNR.

The new Honduran government, elected in November 1985, ratified the draft Letter of Understanding in March 1986. Comayagua was picked as the pilot project site. SNR representatives visited Washington in August 1986 to meet with AED and AID/W personnel and to interview candidates for the position of field director in Honduras. In September 1986, the SNR team accepted Ms. Valerie Barzetti for a four-month assignment as field director, pending contracting of a more experienced person. With three short-term advisors, she began identifying appropriate agricultural technologies, mounting the developmental investigation, and establishing the Comayagua office and staff. Dr. Milton Muñoz replaced Ms. Barzetti in February 1987.

In Peru, agreements were finalized in 1986 with INIPA to test the CTTA concept. Beginning in November 1986, Jose Ignacio Mata began work as the field director, assisted by Ms. Martha Cruz. Despite changes in the test locations due to security problems, work in Huaraz was initiated in January 1987. The overall chronology of the CTTA project can be summarized as follows.

1. The project agreement was signed on 15 April 1985, with the project scheduled to continue until 1992.
2. Implementation was initiated at the primary site in Comayagua, Honduras in September 1986, in collaboration with three extension agencies.
3. By November 1987, five more Honduran agencies joined in the CTTA experiment; and by March 1988, another five were added.

4. The developmental evaluation was initiated in Comayagua on 1 May 1987. The first round of data for the summative evaluation had been collected by 31 December 1988 under a subcontract with Applied Communication Technologies (ACT).
5. Implementation in Peru was plagued by political instability, but field operations were initiated in Huaraz in January 1987. Developmental investigation was conducted in Huaraz in February 1987, and the first formative evaluation in June 1987.
6. Project activities were expanded to Puno, Peru in June 1988, in collaboration with regional experiment stations and development projects such as PISA (an investigation of Andean agrarian systems) and PAL and PAMPA (both alpaca projects). The stations and projects will provide local funding to institutionalize the process, and CTTA will fund advisory assistance by Mata and Cruz. The Puno expansion is designed to test the CTTA process in eight communities, with three others serving as controls. The Puno developmental investigation was completed in November 1988, in the space of only two weeks.
7. About the same time (November 1988), CTTA began work with an extension agency in Chiclayo, Peru; developmental investigation was started there in December 1988.
8. Implementation of a modified version of the CTTA process was initiated in the Jordan Valley and in a Jordanian Highlands project in October 1987.
9. Implementation of the communications media component of the CTTA process was begun in Indonesia in October 1987.
10. Two exploratory studies on the application of the CTTA process in Niger and Senegal were conducted in 1987 and 1988.

B. Funding

The CTTA project was created at a time (1984-1985) when A.I.D. resources were much greater. The project design spanned eight years, a primary site in Honduras, and eight collaborating sites. Funding was scheduled at \$19.5 million. Funding arrangements involved three S&T offices -- Education (ED), Rural and Institutional Development (RD), and Agriculture (AG) -- plus mission buy-ins where the CTTA concept was to be tested.

Table 1 displays an estimate of the obligated funding for CTTA. For the entire project through FY 1989, a total of only \$7.4 million has been, or is slated to be, obligated. The pilot sites have received 78% of the funding with the balance for home office operations.

Table 1: Summary of Programmed versus Obligated Funding for CTTA by Location and Source through FY 1989 (\$,000)

Location	Programmed ¹			Obligated ²			
	S&T	Missions	Total	S&T	Missions	Other	Total
Honduras	1,400	1,300	2,700	930	285	845 ³	2,060
Peru	400	400	800	410	410		820
Other Sites	3,600	6,900	10,500	120	2,383	341 ⁴	2,844
Home Office	1,700	990	2,690 ⁵	1,662			1,662
TOTAL			16,690 ⁶	3,122	3,078	1,186	7,386

¹ Source: illustrative budgets in the project paper.

² Obligated and planned through FY 1989.

³ This amount was designated for FHIA through Cornell University.

⁴ Note allocations in Table 2.

⁵ Estimated from illustrative budgets in the project paper.

⁶ Contingencies and inflation not included, the programmed total was \$19.4 million with \$7.3 million planned from S&T and \$12.1 million planned from missions.

Table 2 details the sources of obligated funds. Note that of the obligated amount as of April 1989, some 42% derives from missions, 42% percent from the central bureau, and 16% from other sources.

**Table 2: Sources of Obligated CTTA Funding
by Location and Year (\$,000)**

Sites	Years					Total
	1985	1986	1987	1988	1989	
Central						
S/T	722.3	685.0	540.0	650.0	525.0	3,122.3
Missions						
Honduras/SNR					285.0	285.0
Peru		150.0	120.0	140.0		410.0
Indonesia			10.0	2,072.7		2,082.7
Jordan				300.0		300.0
SUBTOTAL	722.3	835.0	670.0	3,162.7	810.0	6,200.0
Others						
Specials S/T (Tech ID for Africa)		46.0				46.0
Honduras/FHIA	250.0	250.0	250.0	95.0		845.0
Indonesia		3.0				3.0
ROCAP (regional network)			11.0			11.0
ROCAP Conference ¹				100.0		100.0
CDIE (Bogor Institute of Agriculture/Indonesia)			13.7			13.7
ANE/TR (Site Development, Asia/Near East)			50.0			50.0
S/T (RD-Innovation Activity in Africa)			100.0			100.0
USAID/Sri Lanka				17.7		17.7
SUBTOTAL	250.0	299.0	424.7	212.7		1,186.4
Total	972.3	1,134.0	1,094.7	3,375.4	810.0	7,386.4

¹ Designated to AED for developing a regional conference on technology transfer. This has been an on-going effort involving IICA and others with a scheduled conference in November or December 1989.

Table 3 attempts to summarize actual obligations through April 1989. There were drastic reductions between the PP and implementation stages, with approximately a 60% to 65% budget reduction over the period 1985 to 1989. The obligated amount through June 1990 of \$7.4 million represents only 36% of the \$19.4 million originally programmed. Including FY 1989, obligated amounts totaled \$7.4 million from 1985 to June 1990. Actual expenditures through April 1989 totaled \$5.7 million, leaving \$1.7 million.

**Table 3: Summary of Project Obligations
by Contractors and Locations (\$,000)**

Locations	Contractors			Total
	AED--as of 9/30/89	ACT--as of 12/31/88	Cornell--as of 9/30/88	
Honduras/SNR	875.8	339.2	-	1,215.0
Honduras/FHIA	301.4	-	543.6	845.0
Peru	637.4	144.0	38.6	820.0
Indonesia	2,131.9	0.8	-	2,132.7
Jordan	334.9	35.1	-	370.0
Home office	1,264.1	226.9	171.0	1,662.0
Other	323.2	11.5	6.4	341.1
Total	5,868.7	757.5	759.6	7,385.8

However, incorporated in this latter figure is a pre-paid Indonesia buy-in of 1.2 million as of 30 April 1989 -- all of which must be expended by April 1990 and only in Indonesia. Likewise, the Honduran buy-in of \$250,000 must be spent in Honduras, Jordan's in Jordan, and so forth. In addition, matching payments to Peru in the sum of \$140,000 are as yet outstanding. After all these considerations are taken into account, approximately \$336,000 remains in the central pipeline to meet all subcontract expenses for the summative evaluation and all home office expenditures until end-of-project. Thus, only a very narrow pipeline of flexible funds exits for re-budgeting, whether for deliverables, wrap-up, or carry-on activities.

AED is the project's prime contractor, with two subcontracts: one to ACT for the summative evaluation; and another to Cornell University for assistance in communications strategizing generally but especially in Asia, plus additional assistance to an agricultural research foundation (FHIA) in Honduras. Table 3 also summarizes planned and actual expenditures by contractor or subcontractor and location.

As of the time of the midterm evaluation in May 1989, AED has executed over \$5.7 million or 79% of the obligated amounts. In Honduras the majority of AED field expenditures have been made to pilot and develop the CTTA process. It is not entirely clear how much of the expenditures in Indonesia and Jordan relate directly to the CTTA process. In the subcontract to ACT for the summative evaluation, the obligated amount of \$758,000 represents about 50% of the original PP estimate. Due to financial constraints and some complicated management issues (see D below and Section III E), the prime contractor suspended all financial support for ACT as of 31 December 1988.

With FHIA in Honduras, the Cornell subcontract focused on developing a communications unit and appropriate communications strategies, and on building an endowment for the foundation. CTTA resources were expended for both these endeavors.

However, this subcontract was suspended as of 1 July 1988 because of financial constraints and uncertainties about FHIA's role in the further institutionalization of the CTTA process.

C. Technical Assistance

As in the funding analysis, financing methods and budget reductions required substantial departures from original estimates of the level of technical assistance (Table 4). Table 4's data are not complete, but the relevant comparisons are executed against adjusted levels of effort.

Table 4: Summary of Technical Assistance for Implementation (Professional Staff) Programmed versus Executed, 1985-1992 in Person Months

Type and Location	Programmed ⁵		Executed as of April 1989 ⁶
	Initially	Adjusted ¹	
A. IMPLEMENTATION			
Long-term			
Honduras/SNR	96.0 ²	48.0	34.0
Peru	42.0 ²	42.0	29.0
Other sites	264.0 ²		
Jordan		15.0	14.0
Indonesia		110.5	51.0
Honduras/FHIA	6.0 ²	48.0	48.0
Home office	336.0	210.0	96.0
SUBTOTAL	744.0	473.5	272.0
Short-term			
Honduras/SNR	37.0	10.0	6.0
Peru	8.0	6.0	8.0
Other sites	42.0		
Jordan		10.0 ³	1.5
Indonesia		38.0 ³	6.8
Honduras/FHIA	2.0	-- ⁴	-- ⁴
Home office	88.0		
SUBTOTAL	177.0	64.0	22.3
Subtotal, Implementation	921.0	537.5	294.3
B. EVALUATION			
Long-term			
Honduras	48.0	24.0	19.0
Peru	0.0	24.0	24.0
Other sites	0.0	0.0	0.0
Home Office	195.0	0.0	34.0
SUBTOTAL	243.0	48.0	77.0
Short-term			
Honduras	5.6	10.0	10.0
Peru	3.5	4.0	4.0
Other sites	34.5	n.a. ⁴	n.a. ⁴
Home office	0.0	0.0	0.0
SUBTOTAL	43.6	14.0	14.0
Subtotal, Evaluation	286.6	62.0	91.0

¹ Adjusted as budgets were reduced.

² Estimated from the project paper.

³ Estimated from buy-in budgets.

⁴ No figures available.

⁵ Estimated from the proposal for Evaluation.

⁶ Estimated by ACT for Section B, Evaluation.

For the implementation of CTTA in Honduras and Peru, the executed amounts of both long- and short-term technical assistance represent about 55% of the adjusted levels. Approximately 57% of long-term and 35% of adjusted short-term levels have been executed. At other sites, there are large gaps in both long- and short-term technical assistance levels of executed against adjusted amounts.

With respect to the evaluation component, given the incomplete data set, the aggregate executed levels exceed the adjusted levels. But as Table 4 shows, the evaluation subcontract with ACT originally programmed over 275 person months. This level of effort was drastically reduced and assignments shifted. However, as of early 1989, the ACT evaluation unit had implemented 91 and 43 person months of long-term and short-term assistance, respectively, in Honduras and Peru.

Data on Cornell's level of effort are very incomplete. The general view is that this subcontractor's programmed assistance to FHIA has been completed. However, uncertainties over future FHIA activities raise doubts about the relationship between FHIA's communications component and national efforts to institute the CTTA process.

D. Other Inputs

1. AID/W Managerial Inputs

The unique, tripartite ED/AG/RD managerial and funding structure of CTTA represents a laudable effort on the part of AID/W to administratively unite and recognize the interrelatedness of what are, in "real world" terms, inseparable elements of agricultural technology transfer. However, this union has not been without strains, due to a variety of factors.

One is simply the "committee effect" that makes decision-making more complex and diffuse. Another is the difficulty of inter-office collaboration in any highly structured bureaucracy. Even with the best of will, this inevitably slows decision-making and other project actions, and leads to confusing signals. Third, frequent staff turnovers within offices and consequent inconsistencies in leadership have threatened program coherence.

A fourth factor is the understandably different interests each S&T office brought to and sought from CTTA. As the lead office, ED was most excited about the opportunity to test potentially powerful new applications of communications strategies it had pioneered in earlier health-related projects. However, this interest may have led it to over-invest in evaluative machinery to the detriment of project implementation. AG pragmatically hoped for a way to expeditiously move both new and "shelf" technology into farmers' fields; but this office appears to have provided relatively little financial support and scientific leadership to CTTA. More input from AG might have made for a more agriculturally informed and targeted evaluation plan that would have better served AG goals (Section III E). RD appears to have demonstrated great intellectual interest in the project, viewing the CTTA process as a promising participatory and broadly appropriate alternative to conventional TT approaches; yet RD has had relatively limited authority.

2. Contractor and Subcontractor Managerial Inputs

There have also been strains and turnovers on the contractors' end, too. A change in AED directorship has led to some re-focusing of emphasis on different elements of the CTTA process. At the same time, strains have arisen over subcontractor performance to date on the summative analysis. These are discussed in detail in Section III E and in IV's Conclusions and Recommendations.

3. Mission Inputs

Both AID/H and AID/P are verbally extremely enthusiastic about the CTTA project and its achievements (Chapter III). However, mission financial support in both Honduras and Peru for CTTA has been somewhat disappointing, and the hoped-for number of buy-ins by other missions have not been forthcoming. There are several possible reasons for this.

One is that, to individuals and missions unfamiliar with the full scope of CTTA, the term "communication" in the project title may have signalled a conventional type of communications add-on to other projects, rather than the overarching process of participatory technology transfer that CTTA offers.

Another part of the explanation may lie in a pervasive sense that CTTA is "just another S&T project" directed from the central bureau. Mission staff often fail to take real ownership of such projects, and may accept them only as another potential source of funding to be tapped.

A more profound explanation for the disappointing support from AID/H and AID/P centers on both missions' weariness and frustration in working with public-sector extension, given so many past failures in this arena (recall Chapter I). At the same time that they praise CTTA's visible success in, as one AID/H interviewee put it, "meeting the institutional problem head-on," they seem nevertheless reluctant to re-engage this thorny problem. Put another way, missions are wary of throwing good money after bad in an area where history tells them that the returns to investment are likely to be poor. Arguing for greater investment in CTTA may be seen by some as a risky mission or career move in an era when public-sector involvement is unfashionable.

AID/P further expressed its concern over the realistic possibilities for sustained institutionalization of the CTTA process given Peru's present political and economic disarray (next section) and shifts in institutional responsibility for extension after 1986. I.e., extension was moved from INIPA/INIAA back to the MOA, which is notoriously lacking in resources. Moreover, the AID/P agriculture office has made a conscious decision to focus on research rather than extension. (This may have reinforced perceptions of CTTA as primarily an S&T research experiment.)

4. Host Country Conditions and Inputs

Both Honduras and Peru are experiencing serious political and economic problems. Details of political-economic conditions in each country are presented in Appendix B. Briefly, however, during the 1980's overall real growth rates have declined, public-sector employment has ballooned, and austerity programs have meant little operational support for public programs. Political strife in many parts of Central America and consequent migrational movements are further stressing Honduras' limited resources; and in Peru, terrorist activity is rampant in both the capital and the countryside.

These political-economic realities have implications for the working-out of CTTA on-the-ground. Economic austerity has meant that, in both nations, government financial contributions for staff salaries and operational costs have been minimal, whether for research, extension, or agricultural communications. In Peru, political violence forced abandonment of the sites originally selected for testing the CTTA approach and thus delayed field implementation. Continuing terrorist action in both urban and rural areas, accompanied by destruction of critical infrastructural resources like the supply of electricity, and peasant uprisings in Puno have further handicapped project operations.

The poor economic status and political instability of both countries do not provide hospitable conditions for any development project. These conditions raise questions about the prospects for institutionalization of the CTTA process.

E. Special Conditions and Considerations

First, it should again be emphasized that central funding constraints have made actual funding for CTTA less than half that originally envisioned. Post-1985 funding restrictions have had a number of impacts on the project: diminished activities within the primary site, Honduras; a reduced scope of work for Peru; a sharp cutback in home office involvement; and only partial collaboration for Indonesia and Jordan.

Second, in both Honduras and Peru, CTTA has so far focused on transferring relatively simple technologies to small farmers with some marketable surplus or to near-subsistence producers. But other agricultural client groups contribute substantially to increased economic growth. They produce much of the market surpluses that feed burgeoning urban populations, the food and fiber exports that yield foreign exchange, and the raw materials that supply indigenous manufacturers or contribute to import substitution strategies. The concern here is whether the CTTA process is equally applicable to these other client groups, insofar as they are more intimately involved with input and product marketing firms, are better educated, and usually require more complicated technologies and extension information. The CTTA's applicability in this regard remains to be demonstrated.

Third, the CTTA (or any TT) process is only one of many components in an agricultural science-based development strategy. The others include: generation of new knowledge, techniques, equipment, and their uses -- i.e. research beyond simple adaptation; education, i.e. training for farmers, scientists, transfer agents, administrators, business

leaders, etc.; linkages between science and factor or product marketing firms -- assembly, storage, food processing, distribution, etc.; and agricultural policy making. All these components, including technology transfer, involve many private and public institutions as well as processes for integrating actions among and within components.

To date, CTTA has mainly focused on the public sector and on linkages among and training for farmers, researchers, and extensionists; and as noted above, it has worked mostly with only one client group of producers. CTTA was also designed to collaborate with input suppliers, but so far they have been only very modestly involved in the project. In part this is because, in both Peru and Honduras, input suppliers are predominantly public enterprises. Given greater private-sector involvement in input markets, the institution of collaborative activities between private firms and CTTA would be relatively easy; the complementarity of interests is very evident. Such actions would span suppliers or associations involved in distributing fertilizers, agrochemicals, certified seed, veterinary inputs, and general livestock services such as artificial insemination. CTTA linkages with these groups, too, deserve further exploration and testing.

Fourth, how does CTTA relate to other AID/W initiatives like the FSR and Interpaks projects? Certain FSR features are also embodied in CTTA, e.g. diagnostic/developmental investigation, technology adaptation, and feedback mechanisms. However, because the FSR project was discontinued, more direct linkages were not possible. In contrast, much of the Interpaks philosophy and process is not woven into the CTTA concept -- notably, the emphasis on rational agricultural policies and institutionalization. Again, implications and lessons learned from CTTA for these or future A.I.D. initiatives should be examined.

Finally, it appears that CTTA has paid relatively little attention to women in the technology identification and transfer phase, particularly in Honduras.

Despite the foregoing considerations, queries, and caveats, it is clear that CTTA has achieved some remarkable outputs, even with its shrunken and sometimes conflicted inputs. The next chapter details these outputs.

III. Project Process and Outputs

A. The CTTA Process

As noted in Chapters I and II, CTTA has sometimes been misperceived as a traditional agricultural "communications" project, i.e., a promotion of the use of multiple media in the transfer of agricultural technology. What the evaluation team found instead is that, as implemented in Honduras and Peru, CTTA is much more than just a media effort. It has succeeded in developing a systematic transfer process that is highly sensitive to its farmer client groups, integrates research and extension, provides for a high degree of farmer participation, utilizes existing personnel and resources in an orderly and cost-efficient manner, and inspires a surprisingly high level of motivation and enthusiasm among all project participants in-country.

The CTTA process can be broadly schematized in six steps. For the interested reader, a CTTA Project Manual (Ray et al. 1986) gives precise details and formal guidelines on how each of these steps is structured and operationalized.

1. Investigation. The first step is a developmental investigation, consisting of the following substeps.
 - a) An analysis of the client groups to be served is made -- where they live and how they are organized; what they grow and the levels of technology they employ; the problems they are encountering in crop production; their social, economic, educational, linguistic, and cultural characteristics; and their preferred modes for receiving information.
 - b) Available improved technologies are identified in consultation with researchers and others. Then the views of the farmer-client group on the appropriateness of these technologies are sought. This exercise involves looking at the potential costs and the economic benefits of using a technology, its ease of comprehension and application, and the risks it entails, especially for low-resource farmers. This step may suggest additional adaptations of known technologies.
 - c) Information is gathered on the agricultural sector's support systems so as to determine if the inputs, credit, markets, and other goods and services required to enable the farmer to adopt the technology are or can be made available in an adequate and timely fashion.
2. Planning and Strategy Development. The information collected in the investigation phase is used to develop an overall plan that identifies and prioritizes farm communities, crops, and technologies to be included in the TT program. A comprehensive communications strategy outlines the media to be used, including interpersonal farmer-extensionist interactions, graphics and printed matter (manuals, posters, leaflets), and radio broadcasts. A procedure is developed for breaking down information about the targeted technologies into easily understandable messages that

are geared to the agricultural calendar. In addition, the plan includes regularly scheduled training for extensionists and communicators.

3. **Validation.** Both the technologies and the mass media messages are tested at the farmer level to assure that they are appropriate, that messages are understood and accepted by the target audience, and that producers are thus convinced to utilize the new technologies.
4. **Production and Distribution.** Once both the technologies and their associated media messages are validated, printed materials and radio programs are produced for mass diffusion. The production process is directly tied to the agricultural calendar to assure that messages reach farmers in a timely way. Printed materials are distributed by extensionists through diverse channels such as community leaders (teachers, mayors, nurses, etc.) and farm supply stores. The same technologies and messages are transmitted by extension agents, in printed matter, and on the radio so that they reinforce one another.
5. **Formative Evaluation.** The CTTA process emphasizes the need for periodic "formative" evaluations to determine: whether messages are reaching farmers as planned; which channels are attended to the most; which messages are being assimilated and which need reinforcement; which technologies and behaviors are being adopted, how they are applied, and with what results; and how farmers' attitudes and willingness to take risks are being changed. Iterative formative evaluations are intended to provide rapid but reliable results for immediate decision-making. These evaluations form part of ongoing project management.
6. **Continuous Monitoring.** Throughout the process, there is also provision for continuous monitoring so as to be able to react quickly to unforeseen problems, such as climatic shifts, fluxes in market prices, major pest attacks, etc. This provides a permanent feedback system among farmers, extensionists, researchers, and other public and private sector actors.

1. Application of the Process in Honduras and Peru

Honduras. In the pilot effort in Comayagua, Honduras, the various steps in the process were carried out at the extension agency level by a team composed of the agency director, one or two researchers, one or two extensionists, and a social promoter. The agency team was assisted by the Regional Communications Unit which was composed of an agricultural engineer as Chief, a journalist, a radio announcer, a photographer, a draftsman, a librarian, and a secretary.

Public-sector research and extension personnel worked together to find out what kinds of production problems were bothering farmers, what levels of technology farmers were using, and what kinds of to-them new technology would be appropriate for their circumstances. The pilot effort started in three agencies serving a total of 2500 clients. A sample of 350 farmers was drawn from census rolls; and a technology identification inventory and a developmental investigation were completed by the agency team. The next

step was to design an extension/communication plan that targeted priority groups of farmers and crops, the technologies to be transferred, and the channels to be used for getting the information to the target population. A similar plan was prepared to prioritize research activities based upon farmers' needs.

As logical and simple as it seems, the CTTA approach represented a major departure from the way that agricultural RD&E had traditionally been carried out in Honduras. The conventional procedure was for the SNR Research Department to establish its own research priorities with no direct reference to the perceived needs of farmers. Department personnel performed adaptive research at experiment stations, regional trials at the stations and on farms, and validation trials in farmers' fields -- all with almost no involvement of extensionists or farmers. Even for on-farm trials, producers merely provided the land while the researchers did everything else. This gave producers no sense of participation, decision-making, or ownership in the RD&E process. The resulting technological packages were then "turned over" to extensionists for "transfer" to farmers.

Extension targets in Honduras were set at the central level of the SNR. Typically, targets were couched in terms of the number of hectares per crop to be "covered" by each Regional Directorate and extension agency. It was then up to regional directors, agency directors, and often individual extensionists to decide how to "cover" the assigned area. This resulted in ad hoc, uneven technology transfer with a multiplicity of approaches and messages, many of them conflicting.

Peru. In Peru, the government signed a December 1982 agreement with Israel and the World Bank to apply the Training and Visit (T&V) extension system nationwide. According to longtime, highly placed interviewees in INIAA, only in 1981 did this organization take the decision to re-initiate significant activity in the area of extension. These same interviewees pointed out that virtually no extension system existed during Peru's long period of military rule. As one man noted, "For 15 years the military government basically suspended extension and worked only at land reform or at assistance to irrigated agriculture."

With respect to the T&V system initiated in 1982, interviewees made many of the same complaints about extension services that were heard in Honduras. Given the long hiatus in serious extension endeavors, interviewees were particularly appreciative of CTTA's training component, as a means of re-invigorating extension. They also emphasized the superiority of the CTTA process over T&V in providing much-needed, dynamic links between research and extension.

In sum, interviewees in both Honduras and Peru made many favorable comments about the CTTA process. One highly experienced extension director in Peru noted that "This system confirms many things that extensionists already knew, but such knowledge was never put down in black and white." Another extension director in Honduras added, "Anyone who has seen the results wants to participate." There were numerous such comments, but one of the most telling came from the technical director of INIAA in Peru: "INIPA's [now INIAA] experience was that under T&V methods, only 5% to 10% of the farmers could be reached directly, but with CTTA you can reach 30% to 40%."

B. General Outputs

The experimental design of CTTA calls for project outputs to be evaluated in at least three ways: changes in attitudes; transfer of knowledge, i.e. changes in capacity; and changes in physical output, e.g. crop yields, net farm income, etc. Unfortunately, to date there has been no formal, rigorous analysis of the output measures in an organized quantitative manner due to flaws and confusions in the design of the summative evaluation and delays in processing its massive data base (see relevant section).

However, the midterm evaluation team collected considerable qualitative data in the form of interview responses like those cited above, as well as training and materials inventories. These interim data support a very positive impression of the CTTA technology transfer process in a number of regards.

For example, although earlier models of TT have occasionally paid lip service to the need for dynamic dialogue (i.e, communication) among all players in agricultural RD&E, CTTA has built, and is in the process of testing, a methodology that actually operationalizes this ideal. Moreover, as interviewees with decades of research and extension experience in both Honduras and Peru emphasized, this methodology gives fresh order and meaning to previous approaches involving farmers, researchers, and extensionists, with communicators now serving as "brokers" who tie these units together within a true system of agricultural RD&E.

To give just a sampling of the extensive commentary in this vein, as a high-placed SRN staffer observed, "For many years the government of Honduras has been unable to organize its agricultural research and extension systems. ...There was total pandemonium. ...CTTA will be fundamental for the future of agricultural development in Honduras." And from an AID/H administrator, "The harmony between the CTTA approach and the structure and needs of the agricultural establishment in this country is impressive."

Similarly, in Peru a longtime INIAA/INIPA staffer explained, "CTTA... makes a team out of farmers, researchers, and extensionists." INIAA's technical director noted that, "CTTA represents a way to systematize our work."

Field-level extension personnel in both countries emphasized the clear sense of purpose and organization that this approach has brought to their work. Many commented on the goal direction they felt it provided, and on the "new understanding," "cohesiveness," and "recognition of mutual responsibilities" that it has engendered. As one man summed up, "This methodology works for everyone."

Farmers frequently expressed positive changes in their confidence in extensionists - the very same extensionists who, farmers previously complained, seldom visited the community, gave conflicting messages, and generally displayed little interest in their work. Moreover, there also appeared to be changes in the credibility that both farmers and extensionists placed in government commitment to and success in agricultural assistance. Knowledge that was reliable was being transferred and, within even a single cropping cycle, began to yield visible results.

In sum, there have been positive motivational changes among all participants in the CTTA process. These changes seem to relate to the fact that the process increases personal self-esteem for a lot of people. They are given a vision; there are no empty promises; and knowledge transfer produces immediate, tangible results (see following sections).

The apparent success of this project and the enthusiasm it has generated among all players in the public agricultural technology system of Honduras and Peru is both explained and illustrated by reference to five key components of the CTTA approach.

- A fundamental emphasis on farmer participation.
- Tight integration of researchers, extensionists, and farmers.
- Careful and systematic planning and execution of an overall TT approach.
- Design and utilization of extremely client-sensitive communications strategies.
- Continual attention to monitoring and feedback mechanisms.

1. Farmer Participation

Farmer participation is the core of the CTTA process. While other models give rhetorical recognition to this element, the Honduras and Peru projects have actually operationalized it as both the beginning and iterative endpoint of the technology transfer process.

Farmer participation begins in the developmental investigation where, as members of a *Comite Agricola* interviewed in Honduras pointed out, "For the first time, someone asked us what our problems were; before this, we thought that our government was deaf."

After problems are prioritized with farmers and potentially appropriate technologies have been selected in consultation with researchers, farmers then participate in validating the technologies. This is accomplished through in-depth interviews, focus groups, and collaborative farmer- or cooperative-managed experiments. This process often leads to innovative adjustments in the application of the technology so as to give it a better "fit" with producers' economic, social, and cultural realities. An instructive case example follows.

Transferring Planting Techniques for Maize in the Andes

CTTA diagnostic work revealed that most Huaraz farmers in the target population did not take advantage of the benefits of controlled spacing and plant densities for maize. Planting is traditionally done by women, who follow along behind the plow, dropping a continuous line of seeds. Researchers and extensionists recommended that farmers instead plant by hand as is done in coastal Peru, dropping three seeds into carefully spaced pockets made with a spade. Some researchers indicated that this technique alone could increase production by 15%.

Participating producers noted a number of drawbacks to this recommendation, however. For one thing, people are unfamiliar with the metric system in which researchers and extensionists measured distance. More serious, the proposed technique entails the back-breaking work of repeatedly gouging out pockets and then bending over to seed them (an estimated total of some 21000 times in order to sow a single hectare). The personpower for this technique simply is not available in Andean, as versus coastal, Peru. In any event, such heavy work would have to be done by men. Yet throughout the Andes, a profound ideological analogy between female fertility and agricultural productivity stipulates that women must sow the seed.

Based on these inputs from participating farmers and further consultations by CTTA personnel with researchers, technology recommendations were revised and a creative compromise was struck. Men continued to plow and women to plant, but with a difference. Women now carry a light staff cut to the exact distance for spacing between plants, which they lay down as they proceed, carefully dropping only three seeds at each interval.

CTTA formative evaluations indicate that this new planting technique has one of the highest adoption rates of all the technologies proposed by CTTA to date.

Once a technology is validated, the next step is to design and test effective and intelligible communications strategies to extend it. Farmers are necessarily key participants in this process, too. Via focus groups, surveys, in-depth interviews, consumer panels, etc. they critique every aspect of the print and broadcast media under preparation. Even after CTTA media are put into play, farmer reactions to them are continually monitored and assessed via formative evaluations; and refinements are made to the communications strategies as needed.

Further, producers also participate in the broader dissemination of media and information, as they share and discuss materials and broadcasts with peers. Likewise for technology diffusion. Indeed, in radio broadcasts, their voices and views are often incorporated directly into programming. Whether as voices on the radio, demonstration farmers, or merely as enthusiastic practitioners of a new technique, producers themselves are everywhere the single most credible source of agricultural information among their peers (Lionberger et al. 1975, McCorkle et al. 1988). CTTA has wisely put this principle into practice.

Indeed, in both Honduras and Peru, participating families and communities have been approached by neighbors who want to learn how they, too, can join in and benefit from the CTTA process. For example, stimulated both by radio broadcasts and by firsthand observation of improved technology in action, 13 other communities have sought out

members of Comunidad Recuayhuanca (one of the CTTA/Peru sites) to inquire how to obtain CTTA courses and publications. This kind of burgeoning popular demand and new appreciation for public extension services is directly linked to the fact of producer participation in the technology development and transfer process.

2. Research, Extension, and Farmer Integration

Research. Interviewees in both Honduras and Peru described a long history of duplication of research and/or a proliferation of R&D projects in their countries. Because CTTA promotes communication across the agricultural RD&E system as a whole, many interviewees opined that, along with some institutional restructuring, the CTTA approach constitutes an important tool for confronting the common problem of research fragmentation and the concomitant dissipation of scarce human and financial resources -- what one Honduran scientist termed "random research."

As noted throughout this report, the CTTA approach is grounded in a diagnosis of farmers' present agricultural knowledge, practices, and perceived problems. Working from this diagnosis represents one of the principal ways that integration is achieved among researchers, farmers, extensionists, and communicators. Research attention is directed to and focused on concrete research questions and problems that are immediately relevant to the needs and goals of specific producer groups, as enunciated in the developmental studies ideally conducted jointly by researchers, extensionists, and communicators with farmers.

Within the CTTA process, the developmental investigation in particular has a number of beneficial effects on research. As one highly placed member of INIAA quipped, "Too many of our scientists think they are in the First World when it comes to designing technology suitable for the socioeconomic realities of the Third World. We need to get our feet on the ground." Another added that CTTA's participatory, developmental diagnoses make researchers aware of an important need within the agricultural science system as a whole: to provide a broad selection of technologies, not just technological "recipes" that may or may not fit a given clientele's circumstances.

Still other research benefits of the CTTA process were cited. As INIAA's research director observed, technology appropriate to a given clientele's needs sometimes does exist. But with Peru's virtual cessation of extension services for at least a decade and half, scientists have not bothered to pass their research on to extensionists and/or the latter have failed to communicate useful research findings to farmers. According to this same interviewee, CTTA has stimulated scientists to do a better job of reporting their findings instead of "just leaving them in their desk drawers" now that scientists see their knowledge will actually be put to work.

At the same time, CTTA has heightened scientists' awareness of the possibilities for useful adaptations of "shelf" technology -- as described for maize planting techniques. This has come about because now, researchers interact more directly with extensionists and communicators, who "lay concrete demands before the researchers," based on the developmental investigations among farmers. Numerous interviewees also noted that CTTA has enhanced direct interaction between scientists and farmers through increased on-farm

interviewing and research via CTTA teamworking.

As one Honduran scientist summed up, "CTTA shook us awake and gave us a new light by which to guide our research." A particularly eloquent case example from Peru aptly illustrates this "awakening."

Combatting Papa Kuru in Peru

One of the principal potato pests throughout the Andes is papa kuru (Quechua 'potato worm', Spanish 'gorgojo de los Andes,' Preynnotrypes sp.). These pests survive in the soil from year to year. Drawn by the odor of the potato plant, they emerge in the rainy season. Interestingly, excessive nitrogen applications attract greater numbers of the pests.

The larvae of these species tunnel into and feed upon the potato tuber. This causes losses not only in crop bulk, but also in crop quality. The galleries left by the larvae's feeding are filled with the insects' feces, thus rendering the potatoes inedible either by humans or animals and naturally destroying the commercial value of the crop. The problems do not stop there, however. The larvae also transmit a potato virus; and the adults feed on the leaves (Quispe Caceres 1987).

Of course, technology exists to combat this common plague. But as the CTTA team soon discovered, the standard recommendations involve applying pesticides which virtually none (in the case of Aimbush) or only a few (Sevin 85PM or Dipterex, combined with Gusathion) of the farmer clientele could possibly afford, not to mention the additional cost of a backpack sprayer (I/100,000 in 1989).

CTTA personnel thus returned to researchers to inquire what alternative technologies might exist to meet the needs of less wealthy producers. Based on CTTA's diagnosis of farmers' current practices and on the concrete problem definition of finding no- or low-cost controls for papa kuru, one outcome of this dialogue was that researchers recalled a near-forgotten technique, one so simple that they had not thought it required extension until they were informed that producers did not know it.

This "forgotten" technique consisted merely of better land preparation by plowing three times at certain intervals, instead of just one time, before planting. Each plowing unearths more of the noxious larvae, exposing them to the merciless frosts of the Andes, the intense high-altitude sun, and the voracious appetites of birds.

Along with other recommendations for field cleaning, weed control, and crop rotations, researchers recalled yet another simple, low-cost technique to combat the ubiquitous papa kuru. This involved higher hilling around the base of the potato plant, so that the adult insect cannot deposit its eggs near the tubers.

When these two techniques were communicated, they were readily accepted by producers at all economic levels, despite the extra labor entailed. At the same time, researchers were stimulated to elaborate still other recommendations involving the use of less expensive commercial pesticides (Gusathion and Volaton) for producers with some capital to invest in their potato crop.

Moreover, working together with farmers and extensionists, the CTTA team devised a creative, cost-effective way to apply pesticides with paint brushes rather than expensive sprayers. Finally,

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communicators helped to translate commercial pesticide doses into measures comprehensible in local terms, like "X numbers of tuna can-fuls per water pail."

The outcome of this instance of true researcher-extensionist-farmer-communicator integration was dramatic. In Huaraz, plots infested with papa kuru previously yielded only five or no 100 kg sacks of usable potatoe... Now, these same plots regularly yield 20 sacks of edible and/or commercially acceptable produce.

A parallel case involves CTTA efforts to combat utush, a principal pest of maize in the Andes.

Understanding Utush in the Andes

For maize, one of Andean farmers' greatest fears is utush (Spanish 'gusano de la mazorca,' Eliotis sp.) - a caterpillar that hatches in the maize silk; eats its way down into the choclo (roasting ear), in the process exposing the produce to water damage and rot; then drops to the ground and cocoons itself, to emerge the following year as a moth.

According to researchers, the most feasible response to utush is to spray in the egg stage with the pesticide Sevin. If the spray fails, then each ear of maize must be injected with Sevin by syringe. People invest significantly more money and labor in their choclos -- a high-value, fresh vegetable grown for market sale -- than common food crops. Indeed, the CTTA team discovered that farmers had been (mis)using this chemical in several ways for some time.

Producers were mistakenly spraying the entire plant instead of just the silk, and at the wrong time in the pest's life cycle; also, they were uselessly injecting Sevin after the caterpillars had already hatched and buried themselves deep in the ear. It was only at this point that producers were able to detect the pest's presence. As CTTA personnel explained, "The farmers were just throwing their money away." Worse still, they were harvesting and consuming or selling the treated produce before the pesticide's poisonous effects had time to dissipate!

The CTTA team identified the root problem as farmers' failure to recognize and link the tiny utush eggs in the silk with the caterpillar (and its subsequent moth form). CTTA therefore set about devising communications strategies to educate people about both the pest and the pesticide, using graphics and radio spots. The messages worked. Farmers were soon applying the pesticide to the eggs, at the right time, in the right amounts, and without danger to humans.

The result is that producers now reap larger, "cleaner," top-quality roasting ears that sell for twice the price of mis- or untreated choclos. At the same time, they have realized considerable savings on the cost of pesticides and on the labor of belatedly treating individual ears.

Yet another example is the related role that CTTA has played in reformulating/translating formal methods for randomly sampling this and other pest infestations in the irregularly shaped fields of Andean farmers. The change allows producers themselves to calculate whether pesticides are worth the expense once they have

learned how to identify the different life-cycle stages of the pests, where to search for them, and what chemicals to apply when.

There are many other telling testimonies to the power of the CTTA process (see Bibliography). In Peru alone, for example, these span validation and transfer of: more efficient and careful use of commercial fertilizer doses and mixes; precise timing of irrigation; better seed selection methods; and new knowledge and techniques for combating pests and diseases of wheat, as well as of still other plagues of maize and potatoes in addition to papa kuru and utush -- with some of these techniques based in ancient Andean knowledge of natural pesticides and fungicides like infusions of the alkaloid-laden food crop tarwi (Lupinus mutabilis).

However, the overarching point is that even the best-trained and funded extension systems and the most sophisticated, "slick" communications media cannot succeed unless researchers are accurately informed of farmers' current technical, informational, and socioeconomic resources and can thus identify/devise and communicate realistically workable solutions.

Extension. Extensionists also welcome CTTA's concrete, contextualized problem focus. By responding to producer concerns with truly appropriate technology, CTTA makes extension's job of technology transfer more successful and professionally rewarding. Armed with information that farmers need, want, readily comprehend, have participated in providing and validating, and (as per some field interviews) may even be willing to pay for, extension agents reportedly have experienced impressive gains in motivation, status, morale, and professional self-esteem.

As one Honduran field agent put it, "Now I know that any work I do will have an impact. Why? Because I know it responds to a real need." Such has been the shift in motivation that, when official vehicles break down, agents have been known to take a bus or even walk long distances so as to be sure to arrive on time for their meetings with clients! Reportedly, too, clients now assemble for such meetings early, instead of straggling in late or skipping them altogether. Indeed, agents describe how, in anticipation of their visit, clients even wait along the road to welcome agents when they arrive.

These shifts in the behaviors, attitudes, confidence, and mutual trust and respect of all players in the agricultural science system stand in direct contrast to past situations described for both Honduras and Peru. Extensionists, frustrated with very weak linkages to research, were poorly motivated to perform; alternatively, they tried to create seat-of-the-pants technology recommendations of their own. In either case, extension generally held very low credibility and esteem among farmers.

Certainly, a deciding factor in stimulating more confident, sustained, and/or wide-scale integration between extensionists and farmers has been the communications media. Numerous beneficial outputs of this media-supplemented approach were cited. Interestingly, CTTA media are considered to have almost as many positive impacts on extensionists as producers. For example, extension directors remarked that the media are just as useful for reinforcing extension training as they are for educating farmers. Many

extension directors and agents also emphasized how the media have helped to systematize the information that is to be delivered to producers of a given region and socioeconomic, cultural, and linguistic type.

The very existence of these communication tools has also lent extension a certain cachet and renewed motivation. Agents now have tangible (print) and striking (radio) materials to back up their interpersonal, verbal messages. As one field agent put it, "Before, we went to the campo [countryside] empty-handed. The only materials we had to work with were ourselves."

Moreover, the use CTTA media provides a way to maintain contact with the client population throughout the year, despite problems such as: lack of vehicles, repair funds, and fuel for adequate extension visits; relatedly, the highly dispersed settlement patterns of many client groups; infrastructural and/or climatological conditions that effectively isolate many producers during much or even all of the year; in Peru, co-op land invasions, inter-community disputes, and terrorist actions that threaten the safety of both extensionists and the clients they attend; and in Honduras, annual salary and contractual tangles that can leave the extension service virtually unmanned during eight months of the year.

Indeed, many interviewees commented that radio and print media constitute many producers' only contact with extension. Although CTTA is not designed to substitute for indispensable interpersonal contacts, extensionists nevertheless opined that this indirect contact was "better than nothing," and that at the very least these media served to guide producers to sources of more complete information.

Farmers. Farmer integration has been amply discussed in preceding sections. Here, we will merely note how the team was struck with producers' real hunger for, and appreciation of, competent, reliable extension assistance and improved agricultural technology. To paraphrase just a small sampling of farmer commentary in this regard:

- I have been a farmer for more than 40 years and the truth is that in our community we really have not made any big innovations. What we needed were facts. But before this project, extension always stayed with the big producers. It never came to us small ones. (From a Comite Agricola member in Honduras.)
- This program is practical, and we are really learning from it. Before, we did not even know what caused such things as plagues of insects, so we could not combat them. We would like more information on how to improve our production of broad beans and cattle; our wives would like assistance with their guinea pigs and poultry, too [as well as maize, potatoes, and wheat]. We need to become more "technified." (From farmer interviewees in Peru.)

3. Systematic Planning

One of the strongest features of the CTTA process is the attention devoted to planning and developing an overall TT approach. Using the developmental investigation

as a takeoff point, project personnel, working as a team, prepare detailed plans and strategies for diffusing selected technologies to priority groups. Program participants were uniformly enthusiastic about the benefits of concrete plans for geographic and target audience outreach based upon developmental findings.

Both field agents and extension directors described how, before, their efforts were vitiated by a diffuse, disorganized approach to clients in their assigned regions. With only rudimentary or obsolete baseline information on the distribution of producers, crops, technologies in use, and priority farmer needs and problems, research and extension personnel were unable to efficiently allocate their scanty human, vehicular, and other resources even by such basic parameters as population densities and zonal production potentials.

As one group of Honduran extension agents and directors noted only half-jokingly, previously, clients and communities were often selected for visits merely according to where the agent's girlfriend lived or where he thought he was likely to get the best free lunch! (It is perhaps not an insignificant datum that, armed with the more meaningful conceptualization and organization of their roles and work that CTTA affords, extensionists feel self-confident enough to make such jokes to a team of three expatriate evaluators...). A field extensionist in San Luis elaborated on this theme as follows.

- Before, we [extensionists] had no idea of what we were extending or why. There have been big changes. Now we know how many people will be attended, where, and what training we will give them. Before, we were expected to work with everyone, everywhere. We were just told, "You have to give such and so number of talks and field days." Everything was by numbers, not by objectives. All of the planning was done at a much higher, central level; we just received the orders. Often, we couldn't even read, much less understand, some of the charts of numbers they sent us from the regional level.

With extension goals re-defined in terms of concrete locales and their problems, the program focuses upon a priority selection of communities or agencies until solutions are achieved. Thereafter, a new prioritization is made and other sites are targeted. The result of this kind of coordinated planning and follow-through is professional gratification for and increased confidence among all participants, as each witnesses the positive outcomes of her/his active participation in the CTTA process.

4. Communications Strategies

The same degree of attention is given to determining CTTA communications strategies for transferring technical information. These strategies can be broadly classed into print and broadcast media. The latter consist of radio programs and spots geared primarily for farmer consumption. Printed materials address the entire gamut of players in the public-sector agricultural science system and include: administrative and ministerial reports; scientific and project documents; extension guidebooks, newsletters, and newspapers; and manuals, flyers, bulletins, and posters directed to farmers. CTTA is also

designed to provide support to research and extension database and information services, like Honduras' CEDIA.

Here we discuss only the strategies directed to farmers. However, it is important to note that communicators' preparation and production of materials with and for research, extension, and administrative units represent another communications strategy that works to enhance overall integration and motivation within the agricultural science system.

Without visual aids, it is difficult to capture and "communicate" textually what is "different" about CTTA communications strategies. Certainly, it is not the physical quality of their production. While some (notably administrative and ministerial) documents are very handsomely done, many are of the most modest sort imaginable -- hand-drawn and mimeographed or stencilled. Because of CTTA's exceptionally rocky funding history, radio broadcasts, too, approach the minimum technical quality to be audible and engaging. It is testimony to the great creativity and dedication of CTTA communicators that, working with jerry-rigged or K-Mart-quality equipment under far less-than-ideal political-economic and funding conditions, project broadcasts appear to have had powerful impacts.

Once again, the secret to the success of CTTA communications strategies lies in the "process": the initial diagnosis of farmers' linguistic, educational, socioeconomic, agroecological, etc. characteristics and preferred channels for acquiring credible agricultural information; above all, the participation of researchers, producers, extensionists, and communicators alike in the painstaking validation of media content, presentation, scheduling, etc.; and the continual monitoring of media relevance and efficacy. Together, these elements embody much of the social marketing savvy built into the CTTA approach.

The participatory validation process merits particular discussion. Naturally, the scientific content of messages is carefully reviewed with researchers. But even more important, working closely with communicators, via formative evaluations, representative farmer "consumers" also critique all design features of the communications strategies and messages. This includes considerations like the following.

- The timeliness of delivery vis-a-vis the agricultural calendar and the target clientele's daily work routine. There is little point in delivering a message on, say, land preparation when planting is in full swing. Likewise for print or broadcast messages that are to be delivered at a time of day when producers are too busy to receive them.
- Of course, the choice of language and lexicon. Little is to be gained by couching messages in alien tongues and terms. Accurate translation of scientific jargon or unfamiliar national-language terms into everyday farmer vocabulary is a must.
- Closely related is the choice of dialect and vocal style in radio broadcasts and dramatizations. People generally give more credibility to information delivered by a co-ethnic or peer.

- The graphic design and layout, visual symbolism, logical organization, color scheme, and even the type styles of printed matter must all be validated for intelligibility and appeal. To give just a few, simple examples of farmer inputs that triggered re-formulation of materials, Peruvian producers were led astray by an initially poorly designed graphic which caused them to grossly misapply pesticides. Honduran farmer critics found the order of frames in a cartoon-style flyer on land preparation techniques illogical. Others were unfamiliar with Western-world symbols like the skull-and-crossbones on poisonous chemicals. Peruvian consumer panels judged a script-like font much more readable than an elite type.
- The "interactive" quotient of strategies. In Peru, for example, CTTA technical manuals include a self-test at the end so producers can verify their understanding of the lessons; and in Honduras, radio formats build in opportunities for farmers to recount their own experiences with a new technology, pose questions, and enunciate additional needs or concerns. Information assimilated in an interactive or participatory fashion is more likely to be remembered and used.

This list is only exemplary, not exhaustive, of the kinds of features that CTTA attends to in designing its communications strategies. This is the unique contribution of CTTA communicators.

5. Monitoring and Feedback

Monitoring and feedback constitute the fifth key component of the CTTA process. The objectives are to measure progress to that point, determine strengths and weakness in technology transfer implementation, and feed this information back into the process so as to make timely corrections and improvements.

A good example draws upon the mini-case studies presented earlier on papa kuru and utush. Initially, the CTTA/Peru team concentrated on transferring cheaper, safer, and more efficient pesticides and application methods. However, with inflation running in the thousands of percent per year in Peru, feedback mechanisms soon alerted the team to the fact that fewer and fewer people could afford these costly commercial inputs. Hence, in 1989 CTTA quickly shifted its communications strategies to place more emphasis on proper land preparation and hilling techniques, instead. While these methods of pest control "cost" more labor, they at least gave low-resource farmers an option they could realistically afford in the face of their nation's crumbling economy.

The communications strategies, too, are subject to constant monitoring and feedback. Findings may trigger prompt revisions of message content or structure; re-targeting of outreach efforts to new or more precisely defined populations; re-allocation of investments to reinforce communication channels shown to be most effective or, conversely, most lacking; return to researchers with new or corollary technical problems to be solved; and so forth.

In CTTA formative evaluations to date, message assimilation has been quantitatively assessed through surveys of client subsamples to discover whether farmers have received the

messages promulgating different technology recommendations, can accurately recall the recommendations, have acted upon them, and have done so correctly. Qualitative data are also gathered through participant observation and open-ended interviews on other behavioral and attitudinal changes, crop outcomes, and client concerns.

In essence, this monitoring and feedback component is what makes the CTTA methodology a true "process," in contradistinction to other, more rigid approaches. It is dynamic rather than static, client- and context-sensitive rather than institutionally driven, and participatory rather than hierarchical. To conclude, the five basic components outlined here add up to "communication" in the fullest sense of the word and with it, a successful system of technology RD&E.

C. Training and Diffusion Outputs

Changes in capacity have resulted from the project's many training sessions, workshops, and presentations on the CTTA process with farmers, extensionists, subject matter specialists, extension leaders, agency communicators, university students, A.I.D. officials, leaders of government and development agencies from other countries, personnel of both national and international institutions (e.g., FHIA, FUNDEAGRO, FAO), members of other development projects in-country, and still other groups. Women as well as men have participated in all these activities.

Table 5 provides a numerical summary of these efforts in both countries, with numbers roughly categorized by participant type. (See Appendix C, Tables 1 and 2, for details). Participants interviewed by the team gave glowing reports on the content and value of such efforts.

Table 5: Training In and Presentation on the CTTA Process

Type of Trainee/Participant	Numbers of Trainees/Participants ¹		
	Honduras	Peru	Total
Farmers	79	405	484
Researchers	27	583	610
Extensionists ¹	233	44	277
Communicators	681 ²	83	764
Other, special groups ³	22	131	153
General ⁴	94		94
Total	1,136	1,246	2,382

¹ Includes all levels, from field agents through regional and national directors, as well as students in agricultural extension and related fields.

² During the project, each trainee/participant may have attended more than one course.

³ Includes special groups, e.g. veterinarians, women's organizations.

⁴ Includes unspecified groups, e.g. "ministry staff."

Changes in capacity have also resulted from and been reinforced by CTTA's careful and regular reporting of its activities to national, donor, international, and still other audiences through multiple channels (Table 6). Consult Appendix C, Tables 3 and 4, for concrete illustrations of types and quantities of materials.

Table 6: CTTA Reporting and Outreach Communiques

Type of Communique	Approximate Numbers of Communiques			
	Honduras	Peru	U.S.	Total
Research reports	1			1
Regular project reports ²	8	9	13	30
<i>Enlace</i>	8			8
Flyers, brochures	3	11	2	16
Newsletters	12			12
News briefs			20	20
Miscellaneous technical publications	19	8	10	37
Total	51	28	45	124

¹ Refers to individual types of items, not to total number of copies of each item reproduced.

² Includes semiannual reports and field reports.

D. Physical/Agricultural Outputs

The evaluation team gathered reports of improved yields from interviews with small groups of farmers and other informed sources. There were reports of significant yield increases, particularly in rice in Honduras, resulting from the use of improved seed and new cultural and fertilization practices. A reform-sector cooperative in San Luis, Honduras reported increases in rice yields from 2.0 MT/ha to 5.2 MT/ha. A farmer in Esquias, Honduras increased his yields from 1.7 MT/ha to 5.0 MT/ha.

As noted earlier, potato yields among collaborating farmers in Peru went from very low to medium per hectare, with major improvements in the quality of the produce. Peruvian producers also reported similar yield and quality changes in soft corn production. The project has made no effort to evaluate net income changes. Unfortunately, only anecdotal data like the foregoing on actual agricultural outputs are available at present.

E. Summative Evaluation Outputs

As noted in Chapter I, summative evaluation is not part of the CTTA process, but rather of the project's experimental design. This evaluation is supposed to scientifically validate (or invalidate) CTTA's innovative approach to technology transfer by rigorously measuring the outputs indicated in Sections B-E above, plus the cost-effectiveness of the CTTA approach.

At the time of the midterm evaluation, outputs from the summative evaluation were minimal. Despite CTTA's financial pitfalls, there should have been some preliminary results by this time. While raw data from baseline surveys in both Honduras and Peru exist, the team was unable to obtain analyses of any of these data. Follow-up surveys completed in 1987 and 1988 in Honduras also remain to be analyzed. The team was able to locate only some descriptive reports on crops and agencies in Honduras, along with an assessment of the formative evaluation in Peru. There appear to be various probable reasons for the delays and poor performance on the summative evaluation, independent of financial constraints.

1. There has been confusion over the summative evaluation's principal focus -- the efficacy of communications as an instrument to change farmer behavior, versus productivity and income changes resulting from the CTTA process.
2. Equally important, a clear model of dependent/independent relationships for a general set or subsets of variables was not specified in the original evaluation design. Apparently such relationships were to be defined as the evaluation proceeded or after data became available.
3. There was also substantive disagreement between AED and ACT field and other personnel as to the summative evaluation's design -- whether it tried to gather data on too many variables, without distinguishing agriculturally more versus less important ones; whether its structure was unrealistically academic; and whether its

sampling frames were in all cases representative, e.g. drawn from voter registration or other such lists in regions where many (remote or illiterate) rural households are not included in such rolls.

According to statements by numerous interviewees in both Washington and in the field, in Honduras, the number of "variables" (their term) totaled approximately 2400. CTTA/Peru staff were successful in negotiating this figure down to approximately 1500. Given (2) above, however, the question now is: what to do with all this information?

4. Further disagreements associated with the multiple tier of managers for implementation versus summative evaluation delayed decisions on the latter. Reportedly, a major area of debate was how or whether to utilize preliminary summative data to reinforce and better inform formative evaluations. While one group felt that this was only logical and efficient, another maintained that any knowledge of summative findings on the part of project implementors would prejudice the scientific purity of the experiment -- despite the fact that different sampling frames were used by the two types of evaluations, at least in Honduras.
5. Early on in the project, however, agreement was reached to drop the requirement to evaluate productivity and net income changes, based on the complexity of the relationships between variables and the high cost of completing a credible formal economic and efficiency evaluation. However, this choice further confused project personnel.
6. The summative evaluation team postponed some of its activities in order to support implementation needs for developmental data on communities and commodities.
7. As implementation proceeded, the project drifted away from a narrow focus on farmer behavior toward the transfer process itself. However, at this point the evaluation methodology, with its narrower focus, was already underway.
8. The design for the summative evaluation was negatively impacted because, at least in Honduras, implementation moved much faster than anticipated. Another factor was that attitudinal and adoption changes involving many crops with many production phases necessitated early decisions on overall CTTA plans.

Chapter IV makes specific recommendations for post-midterm steps within CTTA with regard to the summative evaluation.

F. Institutionalization

The project paper calls for institutionalization of the CTTA approach through the development of procedures for the effective use of communication for technology transfer in agriculture and the integration of these procedures into the ongoing research and extension systems of participating nations. While the project appears to have been quite

successful in developing an effective process for technology transfer, it has been only partially so in institutionalizing the process in Honduras and Peru.

As described in Section III C, through a programmed series of workshops and conferences with agricultural administrators, extension leaders, researchers, private sector interests, and university personnel, in both countries CTTA directors have been successful in communicating the CTTA vision and its beneficial effects to many agricultural leaders. Beyond this, however, progress toward institutionalization has varied in the two countries.

1. Honduras

In Honduras, the CTTA process became the basis for designing the "Unified Methodology for the Delivery of Services." This has been codified in a clearly-written manual and officially adopted by the SNR as their approach for the delivery of all Secretariat services, including technology transfer.

The interest in a unified TT approach in Honduras was not new, however. The annual national extension conventions of 1986 and 1987 devoted considerable attention to this issue. They led to formation of a commission to develop a common methodology for technology transfer. The CTTA project advisor and key CTTA staff played major roles in drafting the new methodology. In December 1988, the SNR distributed the unified methodology plan to regional and general directorates with instructions to all employees to systematically introduce this methodology for the delivery of services.

As of April 1989, the methodology was being applied in Comayagua Department (the CTTA pilot area) and was just getting started in five other regions. The SNR has formed a technical team with representatives from research, extension, livestock, human resources, and communications to introduce the methodology throughout the country. A substantial training effort will be required to institutionalize the methodology in the public sector, including site visits and training sessions for SNR personnel at the pilot site in Comayagua.

The SNR Department of Agricultural Communications (DCA), which is key to the whole CTTA process, is currently supported entirely by PL-480 funds. SNR officials stated that a line item for the DCA is to be placed in the GOH budget beginning in January 1990. Given present financial stresses on the GOH, however, AID/H should closely monitor this plan to help assure that the DCA obtains GOH funds next year. With DCA budgetary support and a good training program for the unified methodology in place, the CTTA process stands a very good chance of being institutionalized in Honduras.

2. Peru

In Peru, the CTTA process has attracted a good deal of interest and support, both within INIAA and at the field level. The project has made good headway in demonstrating the benefits of the CTTA process in the Huaraz pilot site. INIAA and MOA officials have visited Huaraz and came away impressed with the improvements in coordination and farmer involvement and coverage that have resulted from application of the CTTA process.

Based upon CTTA's success in Huaraz, INIAA decided to support expansion of the methodology to Chiclayo and Puno.

However, given the project's shorter timeline in Peru and the exceptionally difficult host-country conditions under which it has had to operate, it is understandably a long way from being institutionalized within the public sector. Institutional re-organization, too, has slowed progress on this front. In 1988, the extension service was moved out of INIPA and back to the MOA. As a research project, CTTA was retained in INIAA, the national agricultural research institute. But this has resulted in weak linkages between CTTA and the MOA at the national level. At the same time, the MOA is confronted with an extreme paucity of resources for extension.

The ability to move forward with institutionalization in Peru is also severely constrained by project funding shortfalls, however. The contracts for AED staff will have to be terminated at the end of June 1989 unless additional funds are made available. AID/P indicated that the only local source of funding for continuing these staff after this date would be the Agricultural Technology Development and Transfer (ATT) project. Whether or not these funds are made available is up to INIAA. INIAA's technical director indicated that INIAA personnel have been uniformly impressed with CTTA's work. But he was unsure whether there would be funds to continue AED's technical assistance team (Mata and Cruz), given many competing demands on ATT.

In sum, while INIAA and MOA officials alike have expressed their interest in and support for the CTTA approach, there has been little movement to institutionalize the process within either organization. In Peru, there are as yet no comprehensive documents that describe and explain the process; nor have enough personnel within INIAA yet been trained to take over direction of the program when the AED technical staff withdraws.

IV. Conclusions and Recommendations with Regard to CTTA

A. Conclusions

In most of the developing world, public efforts to transfer agricultural technology have met with little success. As noted in Chapter I, there are many explanations for this. But the overall picture is one of seriously ailing TT systems. This picture formed the background of the healthy skepticism that team members initially brought to the CTTA midterm evaluation.

As the foregoing sections have documented, however, the team's skepticism was transformed into optimism. Based on qualitative findings, the CTTA process, of which communications is but one component, has been successful in a number of arenas. The strong points of the CTTA approach and their qualitative outputs can be summarized as follows.

- It integrates research, extension, and farmer client groups into a cohesive, functioning system.
- It increases the knowledge base of farmers, field extensionists, and regional as well as national research and extension leadership.
- It takes a set of previously uncoordinated activities and puts them in an orderly sequence.
- It makes rational use of existing resources, supplementing these with only modest levels of operational support.
- It is very client-group- and context-sensitive, responding to concrete farmer needs in the context of clients' current technological, educational etc. levels, as identified in the developmental/diagnostic phase.
- It provides for high farmer participation.
- It can respond quickly to changing on- or off-farm conditions, via formative evaluations and continuous monitoring that adjust the TT plan to deal with any unanticipated problems.
- It appears to have positive effects on crop yields and perhaps farm incomes.
- As a result of all of the foregoing, it gives all participants a clear sense of program objectives and their role in achieving them. This in turn translates into high levels of motivation, enthusiasm, and performance on the part of all involved, whether researchers, extensionists, communicators, or farmers.
- It improves the image of a national government's commitment to and seriousness about assisting its rural citizenry.

As described in Chapter III, the CTTA technology transfer process does not involve any really new components. Rather, it incorporates a set of activities that systematizes and empathizes the transfer task; disciplines scientists' research priorities and extensionists' work plans; and instills a sense of motivation, self-esteem, and mutual confidence among researchers, extensionists, and farmers. Moreover, it leads to the kind of knowledge enhancement and shared sensitivity among all participants that may be an absolute requirement for institutionalization.

Unfortunately, at present most of the evidence for CTTA effectiveness is qualitative and anecdotal. In an effort to extend this data base, Appendix B presents a general comparison of CTTA effectiveness with that of two other predominant TT modes (T&V and conventional extension) across four major parameters: changes in attitude, capacity, and physical outputs, plus processual components. In this preliminary analysis, CTTA compares very favorably, outstripping the other two approaches across every parameter and subparameter for which some information could be gathered.

However, much more rigorous data and analysis are required to scientifically demonstrate that any positive changes in the areas of interest are in fact due, either directly or indirectly, to CTTA efforts. Astute summative evaluation of the CTTA process might go far toward allaying wariness of investing in yet another, disappointing mode of technology transfer. While a re-analysis of formative evaluation data might offer some insights in this regard, time did not permit the midterm evaluation team to carry out this task itself. The type of evidence needed includes the following.

- Positive quantitative estimates of productivity changes, net farm income improvements, and a data base for comparing net transfer process benefits (perhaps least-cost comparisons) among alternative TT modes (see Appendix B).
- More systematic data on CTTA outputs in knowledge transfer (including training) to determine the necessary conditions for institutionalization.
- Quantitative indicators on the output of the communications component.
- Additional tests to determine that the process is operative with better-educated and more market-oriented client groups who require more complicated technological packages. However, as a number of interviewees in both Honduras and Peru pointed out, if the CTTA process can work effectively with the kinds of near-subsistence smallholders that have heretofore stymied most extension systems, it is also likely to be successful with higher-resource, better-educated, etc. farmers. Still, this remains to be shown.

Even without these quantitative assessments, however, it is clear that the CTTA process appeals to many players within the agricultural technology system. This appeal appears to relate in part to CTTA's "participatory" emphasis -- an emphasis that embraces not only farmers but also researchers and extensionists. Participants' renewed confidence and motivation also seem linked to the fact that, instead of empty promises, they are given a "vision" which is then put to work in reality. Equally important is the extensive CTTA

training component for all participants. Given administrative and leadership support, the process works.

Of course, technology development and delivery form only one part of a larger, science-based system. The CTTA process alone is unable to address all of the many problems that plague the agricultural science system as a whole in developing countries. In Honduras, these problems include, e.g.: the inability to attract and retain technically qualified personnel because of limited promotional ladders and/or shaky SNR employment practices -- for example, large numbers of contract personnel are not sure whether they will be paid until six or eight months into the year; the high turnover of personnel when political administrations change; and the discontinuities engendered by these turnovers. For Peru: the low salary levels, which trigger considerable moonlighting and personnel turnover; and terrorist actions which knock out the electricity in entire cities and destroy other key infrastructure like roads, bridges, and railways. And for both countries: extreme politicization within research and extension institutions, national economic crises, and concomitant budget uncertainties and shortfalls in the agricultural technology system.

In view of such problems, the wonder is that CTTA has accomplished as much as it has. The prime contractor and A.I.D. management are to be commended for their effectiveness in administering this experimental project under difficult financial, intra-institutional, and host-country conditions.

The CTTA experiment has stimulated some creative thinking about how A.I.D. might assist "sick" agricultural extension programs generally. The following recommendations address essential future actions necessary, first, to fully validate this extremely promising process and its utility in more varied client contexts, and second to "communicate" the process to audiences who can put it to use.

B. Recommendations

1. That resources be mobilized to analyze selected data sets from within the existing raw data of the summative evaluations in Honduras and Peru. Analytic procedures should be thoroughly reviewed and revised to make them more scientifically parsimonious, agriculturally astute, and -- in view of the limited funds remaining to the project -- financially feasible. Existing data should now be subjected to a re-designed and focused plan of analysis.

More specifically, completion of the summative evaluation should focus on quality data (measurement, not recall), small samples, and very careful specification of the issues to be evaluated (see next recommendation). It is also recommended that further summative evaluation efforts focus on the CTTA process; include a strong economic orientation; be performed by agriculturally expert investigators; and draw upon the interpretive knowledge of the present project directors in Honduras and Peru.
2. That priorities in this re-designed summative analysis be assigned as follows: (1) quantification of changes in attitudes (confidence, credibility, motivation) associated

with the CTTA process; (2) quantification of changes in farm yields and net incomes, plus the cost-effectiveness of this approach relative to other TT systems; (3) quantification of changes in knowledge transfer, particularly as these relate to institutionalization of the CTTA process.

For each of these priorities, the key relationships in question must first be properly conceptualized and modeled. There is a pressing need to carefully specify both dependent variables and independent variables, along with the precise analytic methodologies to be used. With these specifications in hand, all existing data from both summative and formative evaluations should be reviewed for pertinence and utility. This review will also serve to identify any crucial data gaps.

3. That project leadership evaluate a partially completed study, initiated by Dr. O. Hernandez, on CTTA institutionalization in Honduras to determine whether the study contains essential descriptive material. If so, a way to purchase/obtain a final analysis and disseminate it to development leaders in Honduras, Peru, and other countries, as well as to A.I.D. missions should be considered.
4. That a videotape be made to graphically depict the CTTA process and to disseminate at least qualitative findings on the process to date. The video should: include activities in both Honduras and Peru; be directed at development leadership audiences worldwide; be produced in Spanish and English; and wherever possible, incorporate quantitative evidence on the three components outlined in (2) above. To deploy scarce financial resources most efficiently, the possibility of producing the video in conjunction with national personnel, equipment, and in situ organizations should be explored.
5. That resources be mobilized and a conceptual outline made to prepare an end-of-project document suitable for dissemination to the global development community with interests in agricultural technology transfer. This document should complement the videotape, summarizing and graphically illustrating the CTTA process. While the AED home office should take the lead in both tasks (videotape and write-up), the CTTA technical advisors in Honduras and Peru should be involved in preparing materials for inclusion in the document, based on their firsthand insights. Moreover, materials and examples from other sites (Indonesia, Jordan, possibly Niger) should be included where relevant to suggest the applicability of CTTA methods to regions other than just Latin America. Again, so as to make most efficient use of scarce resources, creative, cost-effective publishing and dissemination arrangements should be investigated.
6. That, for (4) and (5) above, both national and international leaderships, donor agencies, and research institutes directly involved in agricultural RD&E be targeted as the audiences who can best put to use the lessons learned from the CTTA experiment.
7. That resources be committed to further field validation of the CTTA process with other client groups. There are options in Honduras for Dr. Munoz to work in

selected locations on further testing of the process. Similarly, in Peru there are opportunities for Mr. Mata to collaborate with public agencies in Puno and Chiclayo as well as with FUNDEAGRO on private-sector extension transfer processes. However, further testing must provide both qualitative and quantitative data on the process.

8. That S&T explore the use of core funds to continue the AED/Peru staff for one additional year (through June 1990) to allow sufficient time to thoroughly document the Huaraz experience, prepare training materials for INIAA to extend the methodology to other regions of the country, and work with INIAA staff to develop their capacity to carry on the program after AED personnel withdraw. Although first priority for core funds should be given to documenting and disseminating program results from Honduras, if sufficient resources remain after assuring proper wrap-up there, this should be the second priority.

An alternative to using core funds would be to persuade INIAA and/or FUNDEAGRO to fully or partially fund continuation of the two AED/Peru technical advisors with ATT monies. Another alternative would be to stimulate buy-ins from special AID/W funds to allow Mata and Cruz to work with FUNDEAGRO for a year or two to apply the CTTA methodology in the pilot private-sector technology transfer enterprises contemplated under ATT.

9. That, with regard to all of the foregoing recommendations, the place of and benefits to farm women and female extensionists and trainees be given more explicit attention.
10. That discussions be held with AID/H and AID/P regarding their reluctance to provide greater funding to CTTA. Their concerns may relate to insufficient knowledge of the CTTA process itself and/or to the need for concrete demonstration of its net benefits, cost-effectiveness, agricultural outputs, and chances of sustainable institutionalization.
11. That ways to better integrate the AID/W three-office funding model be sought and that the roles and commitment of AG and RD be clarified and confirmed. S&T AG in particular should lend more scientific leadership to the project and better enunciate what key outputs need to be assessed in order to validate (or invalidate) the CTTA process in the eyes of the agricultural development community as a viable alternative to other TT models.

Many of the foregoing recommendations imply greater parsimony in home-office functions and summative evaluation expenditures in re-budgeting the narrow pipeline of CTTA funds remaining. At the same time, they imply aggressive acquisition of additional funding from a variety of sources both in-country and within AID/W. However, the CTTA appears to be at a key juncture or "payoff point" that warrants such efforts, both with regard to its full validation and its institutionalization.

V. Looking Ahead: General Conclusions and Recommendations

In attempting to look ahead to future A.I.D. needs in agricultural technology transfer, the team met with a number of S&T and regional bureau staff in AID/W. We encountered general agreement that many public-sector extension organizations in A.I.D.-assisted countries are ineffective and constitute a drain on domestic budgets. There was also the feeling that A.I.D. had tried for years to improve these organizations but had been unsuccessful and that both mission and agency leadership were reluctant to commit any further resources to public-sector TT programs.

There was, nevertheless, a uniform recognition that agricultural technology is critical to economic growth. In Asia and Africa there is continued A.I.D. support for agricultural research, but almost none for technology transfer. This has been left largely to the World Bank and its T&V approach. In Latin America, frustration with the ineffectiveness of public-sector extension programs has led to A.I.D. support of private-sector foundations, farmers' associations, or private voluntary organizations as TT alternatives.

Improved approaches to technology transfer are imperative if developing countries are to make effective use of the technology being generated by, e.g., the International Agricultural Research Centers and of donor investments in improving national research systems. The CTTA project offers one such approach. Indeed, as a longtime technical advisor in Peru pointed out, the CTTA process and its communications strategies should be made an automatic part of the "package" of any technology to be extended to any client group. The CTTA approach should be thoroughly documented and widely publicized as suggested in Chapter IV.

As CTTA enters its final phase during FY 1990-1991, S&T should give serious consideration to developing a follow-on TT project. Such an initiative should provide for continued dissemination and application of the CTTA process, but it should also be expanded to include research and field support activities related to options for increased technology transfer by the private sector and to the special problems of natural resources management. To this end, we recommend the following.

1. That over the next two years (FY 1990 and 1991), the remaining CTTA resources be concentrated on documenting and publicizing the technology transfer process developed in Honduras and Peru.
2. That concurrently (during FY 1990-1991), S&T tap into any special funds available for study of the rich and growing experience in private sector approaches to technology transfer, including a comparative analysis of the cost-effectiveness of selected private and public technology transfer mechanisms. S&T should also consider using the Small Activities Fund to conduct a state-of-the-art study of technology transfer approaches for natural resources management.

3. That the probable complementarity of the CTTA process to FSR be explored with the Africa Bureau. This bureau has invested heavily in FSR; the CTTA process might well enhance these previous investments.
4. That S&T undertake a tri-directorate (HR, FN, and EN) collaborative effort to develop a FY 1992 follow-on project to CTTA to assist field missions and host governments that want to improve their TT system in agriculture and natural resources management. The tools available to the project would include the CTTA process, private sector approaches to TT, and improved approaches to TT for natural resources management.
5. That a dialogue be opened with the World Bank on two issues: how the CTTA process might impact the general impression of the high costs of the T&V system; and World Bank interest in further testing and quantitatively evaluating the CTTA process, both for agriculture and natural resources management.

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Appendix A
Team Members, Scope of Work, and Persons Contacted

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Team Members

Dr. A. J. Coutu

The team leader is associated with North Carolina State University (NCSU). He has participated in agricultural evaluations in Latin and Central America. Dr. Coutu has over 25 years of experience in Agricultural Development, including long term assignments in Peru and Washington DC, under contracts with A.I.D..

As an agricultural economist, he has participated in the preparation of project identification documents, project papers, project evaluation and special study assignments with many USAID missions. He was trained at the University of Connecticut, Harvard University, Duke University, and NCSU.

Dr. Coutu was on leave from NCSU to AID/W from mid-1970 to mid-1973. He was head of a new office of agricultural sector analysis in the Technical Assistance Bureau of A.I.D.. In this office he established an administrative unit to focus on agricultural assessment methodologies, programmed a series of projects on agricultural policy analysis, and implemented agricultural sector assessment and planning programs in South Korea, Thailand, Mexico, and other locations.

He has taught courses in economic development, production, economics, and economic principles; and he has contributed to the development literature with many papers, journal articles, and a book about Peru. He also serves as coordinator of a long-term agricultural service development project in Peru, a research coordinator on the APAP II project, and a participant in agricultural science projects in Costa Rica and Uruguay.

Dr. Constance M. McCorkle

Dr. Constance M. McCorkle has 17 years' experience in international research and development, spanning some 20 countries of Latin America and Africa, and including several long-term assignments in Peru and short-term consulting in Honduras. She has participated in the preparation of A.I.D. project papers, project identification documents, and a variety of project evaluations (mid, final, internal).

A faculty member in the Department of Rural Sociology at the University of Missouri-Columbia, Dr. McCorkle also coordinates the Sociology Project of the Small Ruminant Collaborative Research Support Program, which operates in Brazil, Indonesia, Kenya, Morocco, and Peru. She holds a Ph.D. and an M.A. in anthropology from Stanford University, plus a second Stanford M.A. in linguistics with a specialization in sociolinguistics. Her undergraduate studies were done at Rice University and the University of Madrid, Spain.

Her research interests are wide-ranging and interdisciplinary. She has worked in a variety of topics in the sociology of language and applied linguistics, gender and sex-equity issues, bilingual education, and communications. However, her primary research and teaching activities center on international agricultural development, with major concerns in: farming systems research; qualitative methodology; rural community development, quality-of-life, and equity issues; appropriate technology and indigenous knowledge systems; cultural ecology; theories of development, development policy making, and program management; the roles of social scientists in international R&D; and the structure of training programs for students of all disciplines planning careers in international arenas.

Dr. McCorkle has lectured, published, conducted research, and/or advised development programs in all these areas. She has authored 15 articles and book chapters, edited several anthologies on agricultural development, and is presently at work on a scholarly text on peasant agriculture in Peru.

John B. O'Donnell

Mr. O'Donnell is an A.I.D. Senior Foreign Service Officer with over 25 years experience in agricultural and rural development programs in Latin America and Southeast Asia. He is currently Deputy Agency Director for S&T/HR.

Since 1971, Mr. O'Donnell has specialized in Latin American programs with assignments as Chief of the Office of Agriculture and Rural Development in Peru (1977-1982) and Ecuador (1985-1987) and Deputy Chief in Guatemala (1974-1977). He was also Deputy Director and Acting Director of the S&T Office of Rural and Institutional Development (1982-1985), Supervisory Program Analyst in the Latin American Bureau (1971-1973), and recipient of A.I.D.-sponsored graduate training in Agricultural Economic and Regional Planning at Cornell University (1973-1974).

From 1962 to 1970, Mr. O'Donnell held various A.I.D. positions related to agriculture and rural development in Vietnam, Thailand, and Peru. He also served as A.I.D. Officer-in-Residence at the Asia Training Center in Hawaii (1966-1969), where he directed rural development training programs for A.I.D. officers assigned to Southeast Asia.

During his A.I.D. career, Mr. O'Donnell has designed, managed, and evaluated a wide range of agriculture and rural development projects including a number in agricultural research, extension and education, agricultural policy and planning, agricultural marketing and regional development, cooperative development, and natural resources management.

He graduated from Stanford University in Economics and History and did graduate study in Economic and Agricultural Economics at Cornell and the University of Hawaii.

Scope of Work

Mid-Term Evaluation Team, 26 March-15 May 1989

I. Activity to be Evaluated

Communication for Technology Transfer in Agriculture (Contract No. 936-5826-C-00-5054-00)

Total Project Cost: \$19,433,000

(\$7,295,000 S&T Central, \$12,138,000 A.I.D. Missions)

Total Contract Cost: \$16,604,016

Initial FY: 85

Final Contract Year: 90

PACD: 9/30/92

II. Purpose of the Evaluation

This interim evaluation will give information for two different yet related purposes:

A. to analyze project progress toward the objectives set forth in the Project Paper (PP) (as defined by the output, purpose and goal statement of the project's logical framework); and, if appropriate, to A.I.D. to improve management and utilization of remaining project resources; and

B. to look beyond the LOP and assess Office, Directorate and Bureau needs and capabilities for supporting more effective technology transfer in agriculture, especially through the use of enhanced communication. Analysis of these broader programming issues (see A.I.D. Evaluation Handbook April 1987) will be available to help shape future program development and planning in technology transfer and related initiatives.

III. Background

The Communication for Technology Transfer in Agriculture (CTTA) Project was authorized as an eight-year activity to be managed jointly by the Bureau for Science and Technology's Offices of Education, Rural and Institutional Development, and Agriculture. The project purpose as presented in the PP is to "develop and demonstrate a more effective communication support system for technology transfer in agriculture".

CTTA uses an innovative extension approach to transfer technology to farmers. This approach, which is based on social marketing techniques, is characterized by:

a) the analysis of farmer needs and the "feed forward" of this information to Research and Extension to help shape their priorities;

- b) the identification of communication channels used by farmers to become informed of appropriate available technologies, and the informed and targeted use of multiple media to transfer appropriate technologies to farmers; and
- c. the permanent monitoring and frequent evaluation of activities to determine the efficiency and effectiveness of the media utilized. Theoretically, this insures a dynamic flow of information from the "bottom-up" to help shape implementation.

The intent of CTTA is basically twofold: 1) to increase the impact of new technologies on the farmer in an efficient and cost-effective manner, and 2) to institutionalize the CTTA approach to technology transfer in agriculture. Only through institutionalization can activities initiated by the project be sustained beyond the life-of-project funding, and this will be an important concern of the evaluation.

Project outputs (as set forth in the PP, pp. ii-iii) are expected to include evident impact in five key areas:

- 1) development of effective procedures for providing communication support for technology transfer;
- 2) production performance of the farmers in the pilot sites;
- 3) organizational changes induced in the collaborating institutions;
- 4) diffusion of the communication methodology to additional sites; and
- 5) modification of the accepted norms for conducting extension among the international community.

To achieve these outputs the PP calls for \$7,295,000 of S&T funding and substantial complementary funds from field missions. However, Central funding constraints have made actual funding less than half that originally anticipated. This must be taken into careful account by the evaluation team, especially as related to purpose A of this evaluation.

Two interim evaluations were scheduled in the PP (8/87 and 8/89). However, this evaluation is expected to adequately address all the interim evaluation information needs of project management. This is especially true given the strong communications channels that exist between A.I.D./W project management and the cooperating missions, and given their strong endorsements of CTTA.

The timing of this evaluation is appropriate for several reasons. The A.I.D. Evaluation Handbook (April 1987, p. 15) notes that a "major factor in determining when to evaluate is the contribution of the evaluation process itself to improved communication and policy dialogue with A.I.D. recipients during key junctures in implementation and program

development." The project does indeed appear to be at "key junctures" in at least two project sites (Honduras and Peru) especially as regards the institutionalization of CTTA procedures and methodologies. The evaluation process at this time, and the written report that will follow, could contribute substantially to attainment of long-term project objectives.

The recent and innovative CTTA research activity in Niger has also generated a great deal of interest in the academic and the development communities. Requests for the research report "A Case Study on Farmer Innovations and Communication in Niger" have exceeded all expectations, with over 500 copies distributed internationally to a broad audience of scholars and development specialists. Interest in this research continues to grow, and the contractor for CTTA, the Academy for Educational Development, has put increasing emphasis on developing expertise in indigenous agricultural knowledge and their applications to rural development. The evaluation team should assess possible implications of this research, and of AED's apparent commitment to continue to analyze these kind of issues, for the larger CTTA Project.

This is also an appropriate time to assess project performance toward provision of the five kinds of outputs envisioned in the PP, and help disseminate information through the Agency (and the donor community) on the progress that has been achieved. The Agency needs to know why the collaborating missions feel this new approach to technology transfer in agriculture has proven successful, and an evaluation will allow project management to disseminate these conclusions widely. This will also help address purpose B of the evaluation, looking beyond the LOP to assess future Office and Bureau needs and capabilities for supporting more effective technology transfer in agriculture.

IV. Statement of Work

A.I.D. (Evaluation Handbook, p. 23) requires that all evaluations examine several broad concerns "that are applicable to virtually any type of development assistance." These are:

- **"Relevance.** Are the development constraints the project was initially designed to address major problems that are germane to the current development strategies supported by A.I.D.?
- **Effectiveness.** Is the project achieving satisfactory progress toward its stated objectives?
- **Efficiency.** Are the effects of the project being produced at an acceptable cost compared with alternative approaches to accomplishing the same objectives?
- **Impact.** What positive and negative effects are resulting from the project?
- **Sustainability.** Are the effects of the project likely to become sustainable development impacts -- that is, will they continue after A.I.D. funding has stopped?"

The evaluation team is expected to go beyond a simple examination of inputs and outputs to address these larger issues, and in particular, to assess the utility of the CTTA model. This can make the evaluation process especially useful in promoting policy dialogue, and help address the longer-term issues of purpose B.

Specific questions to be addressed are:

Program areas:

1. What do the primary stake holders say about both the actual and potential utility of the project? (e.g. farmers, national: in relevant public and private sector institutions, researchers, A.I.D. and USAID staff, project staff [present and former]).
2. What does the CTTA methodology actually look like "on the ground"? What are the operational priorities, e.g. how are staff and budget resources allocated? What is the role of host country counterparts in this process?
3. How is reality stacking up against the theoretical models presented in project documents? Specifically, how appropriate is the social marketing model for agriculture? How has the implementation plan been changed or adapted and why?
4. How important a model is it for the transfer of agricultural technologies (of marginal utility? of great potential?)? Does CTTA's field experience suggest ways it can be improved?
5. Can mass media serve farmer needs under variable production conditions? What needs to be adapted to variable circumstances? How universal is the methodology?
6. How appropriate/effective/tested/adapted to local circumstances are the agricultural technologies CTTA is working with? How were they/should they be selected?
7. What, if anything, can CTTA do in situation where the technologies to recommend to local farmers are not yet apparent? How useful can the methodology be to the process of technology selection?
8. How effectively has CTTA used mass media to encourage adoption of new technologies?
9. What has been the actual role of evaluation in the project, and how has it related to implementation?
10. How is farm-level data collected and analyzed? What criteria are used for selection of regions? variables? target crops? Has CTTA's field methodology (e.g. sampling techniques, controlled comparisons) met accepted scientific standards?

11. How much project emphasis has been placed on measuring actual project impact on productivity, rather than simple message reception? Should more/less emphasis be given to this issue in the future?
12. Are effective procedures for providing communication support for technology transfer being developed? Are they cost-effective?
13. Are client needs being addressed (i.e. has production performance in the pilot areas been affected? better extension service? greater coverage?)?
14. Are there signs of diffusion of the communication methodologies?
15. What evaluation data should be given priority for analysis and reporting? What are the needs of different audiences (AID/W, USAID's, host-country governments, etc.)?

Management areas:

1. Have the appropriate people, finances and commodities been in the right place, at the right time, operating under the right incentives to insure effective implementation?
2. How effective is management by A.I.D., AED, sub-contractors? What about the three office funding model? Should this model be continued or encouraged in future S&T projects?
3. How is CTTA understood and supported within A.I.D.? What are the main obstacles to securing more interest and buy-ins from USAID Missions and REgional Bureaus? What implications might this have for future of the project, and for any potential follow-on activities, projects or initiatives in technology transfer in agriculture?
4. How effective has been the technical assistance (short and long-term, contractors and subcontractors, etc.) provided to missions? How can it be improved?
5. How has the project interacted with organizations involved in the technology transfer process in the private sector? public sector? PVO community?
6. How effectively are the project's findings being disseminated/marketed to potential users?

Institutional areas:

1. What aspects of the CTTA approach have received attention in the institutionalization process?

2. Explore the ACT methodology for documenting and analyzing the institutionalization process. Should this be given priority?
3. How has motivation for acceptance and commitment to change been generated and/or raised in order to allow for project inception to take place?
4. What has been the political will and absorptive capacity, both technically and financially, to accept and implement the CTTA approach?
5. What has been the attitude within the concerned agencies, the pilot regions and the national level towards the extension approach proposed by CTTA? To what extent is this approach satisfying the government's extension philosophy, needs, and concerns?
6. In Honduras, what has been CTTA's contribution to the definition of MNR's Unified Extension Methodology?
7. Is institutional capacity in cooperating institutions being developed? (i.e. is there any change in the way extension services are being carried out that can be attributed to CTTA?). What evidence is there that any changes will be lasting?
8. Do research administrators better understand and consider the point of view/situation of the farmer thanks to CTTA?
9. What aspects of the project will be sustainable?
10. To what extent has CTTA had access to agricultural technologies proven to be economically feasible for farmers?
11. What training has been given at the agency, national and regional levels to implement the CTTA approach? In what area has this training taken place? How effective has it been in laying the ground work for CTTA activities within and outside the pilot region? How has this training been followed up?
12. What capacity has been developed within the government to better manage an extension approach based on the use of multiple media? What technical expertise has been developed to produce more and better quality media?
13. What incentives for change and adoption of CTTA perspective exists at the agency, regional and national levels? To what extent has an incentive system been utilized to encourage adoption of the CTTA approach?
14. What linkages between extension and research has CTTA strengthened at the agency, regional and national levels? To what extent has farmer involvement in farm research proposed by CTTA been adopted?

15. Within current budgetary constraints of the GOH and GOP, what financial support for CTTA related activities can be expected in the future? Has enough local support been given to date?

16. Is CTTA profitably addressing the full range of potential S&T and Agency needs for assistance in technology transfer in agriculture, or should the project be modified? If so, how?

17. Should the S&T Bureau begin planning a new initiative in technology transfer in agriculture, to begin after the PACD of CTTA? Should this new initiative be a "follow-on" to CTTA, or a completely discrete activity? How would it differ from the current CTTA project?

18. CTTA works to improve technology transfer through enhanced communications between farmers, research and extension. It has not, however, directly addressed improving communications between these actors and other elements of the broader technology development and transfer system, e.g. private sector research and input provision entities, agricultural policy makers, faculties of agriculture, etc. Should CTTA or a future S&T project address this broader technology system, and if so, how?

V. Methods and Procedures

The evaluation team will review available project documents and conduct key informant interviews with project staff, A.I.D./W and mission staff, and project counterparts in Honduras and Peru. It will also make field observations and interview intended beneficiaries in these countries. In addition, in collaboration with A.I.D./W project management, it will help prepare a cable soliciting evaluation information from those missions not visited by the CTTA team (Indonesia, Jordan, and perhaps Niger), and incorporate that information into the evaluation report.

The evaluation must assess the progress that has been made with respect to the institutionalization of the CTTA approach within (but not limited to) the project's pilot regions. It should specify factors that have contributed to or hindered progress towards that goal. This information will be used in planning the initiation of the institutionalization activities in other countries where the CTTA Project can be implemented.

As regards project implementation, the team's emphasis will be on providing project management with sound and useful judgments to help maximize project outputs to the Project Assistance Completion Date. They will also help A.I.D. to assess future needs, capabilities and priorities for technology transfer in agriculture.

Institutionalization should be assessed at three different levels: agency, regional and national. Data will be collected mainly through interviews with concerned parties at each

level. Agencies to be visited within the pilot regions will be sampled. The sampling will be intentional. The purpose of this sampling will be to select, through key informants' insights, those agencies where institutionalization activities are expected to show most and least progress. The same approach will be adopted in the selection of regions, projects and programs which may have manifested interest and involvement in CTTA activities. The evaluation team will consider the sustainability of observed institutional change.

In addition to assessing institutionalization at an organizational level, the evaluation team will assess the actual impact of this institutionalization on technology transfer priorities and strategies. This will include specification on what is not being done differently after institutionalization, and how this may relate to changes in technology transfer processes in the two countries visited.

VI. Evaluation Team Composition

The evaluation team of three persons should be interdisciplinary, with expertise in both social and agricultural sciences, and in communication theory. Given the dual purposes of this evaluation (and especially purpose B) the team should have substantial first-hand experience in working with the broad technology development and transfer system, including agricultural research and extension, private sector input suppliers, faculties of agriculture, etc.

Language proficiency in Spanish is required for at least two team members, and team composition should include both men and women, to avoid gender-based constraints to effective communication.

As recommended in the A.I.D. Evaluation Handbook (April 1987, pp. 25-26), "wherever possible" one team member should be an A.I.D. direct-hire staff not directly associated with the project. He/she must also have the necessary skills and experience to perform all the required evaluation functions. The Handbook notes that "their participation serves as a direct link to Agency operations, expediting the transfer of experience and lessons learned from the evaluation" (p. 260).

VII. Reporting Requirements

A.I.D.'s required format for evaluation reports includes an Executive Summary, Body of the Report, and relevant Annexes.

The executive summary states the development objectives of the activity evaluated; purpose of the evaluation; study method; findings, conclusions and recommendations; and lessons learned about the design and implementation of this type of development activity.

The body of the report should include discussion of (1) the purpose and study questions of the evaluation; (2) the economic, political and social context of the project; (3) team

composition and study methods; (4) evidence/findings of the study concerning the evaluation questions (5) conclusions drawn from the findings; (6) recommendations based on the study findings and conclusions, stated as actions to be taken to improve project performance. Ideally, the report should not exceed 40 pages length.

Appendices should include a copy of the evaluation scope of work, the most current Logical Framework, a list of documents consulted, and individuals and agencies contacted. Additional appendices may include a brief discussion of study methodology and technical topics if necessary.

A complete draft of the evaluation report must be delivered to A.I.D. project management no later than June 15. The final draft should be delivered within 30 days of receipt of comments on the first draft from A.I.D. project management.

Persons Contacted

U.S.

David Bathrick, Director, USAID S&T Agriculture
Clifford Block, Director, USAID Office of Rural and Institutional Development
N. C. Brady, Senior Assistant Administrator, USAID Bureau for Science and Technology
Eric Chetwynd, Director, USAID S&T Rural Development
Dennis Foote, ACT, Inc.
William Furtick, Director, USAID S&T Food and Agriculture Office
Anthony Gayoso, Tony, Director, USAID S&T Human Resources
John Grayzel, USAID S&T Rural Development
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Lane Jepson, Chief, USAID Office of Agriculture and Natural Resources, Africa Bureau
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Jim Lowenthal, Chief, USAID Office of Agriculture and Rural Development, ASIA/Near East Bureau
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Honduras

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Misael Bueso, MNR National Director of DCA-CTTA
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Bertulio Castellanos, DCA Regional Coordinator, Comayagua
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Marco Castillo, Communication Research Section, Comayagua
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Luis Fuentes, Subdirector of MNR's DCA
Arturo Galo, MNR Director General, Livestock
Orly Garcia, MNR National Agricultural Research Assistant
Conrado Gomez, Head, DCA Media Production Section
Carlos Guevara, MNR Regional Subdirector, Comayagua
Robert Hansen, Robert, USAID Program Officer/IDI
Hearne, Peter, USAID LUPE
Augustin Herrera, DCA Radio Producer (and voice of Ing. Martin)
Felipe Mantequa, USAID PSP/Guatemala Menelio Maradiaga, MNR Regional Director,
Olanchito
Juan Blas Melendez, Head, DCA Adaptation of Contents Section
Marvin Melendez, Agricultural Communication Specialist, Olanchito Extension
Jose Montenegro, MNR Vice Minister
Milton Munoz, CTTA/Honduras Project Director
Roberto Paz, MNR Regional Director, Comayagua
Bessy De Ramos, Head, DCA CEDIA Section
Pedro Pablo Raudales, National Subdirector, MNR Extension
Jose Arturo Rivera, USAID Deputy Program Officer
Jose Reyes, MNR Region Director of Extension, Olanchito
Tito Salinas, Head, DCA Communications
David Schaer, USAID/Honduras
Miguel Angel Soler, formerly MNR Regional Director, Comayagua
Melissa Stephens, USAID Development Finance Officer
Laura Suazo, EAP Zamorano student and Programa Desarrollo Rural trainee, Comayagua
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Peru

Jose Arizola, Director, Research Planning, INIAA/Lima
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Antonio Chavez, Executive Technical Director, INIAA/Lima
Martha Cruz, CTTA/Peru
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INIAA/Lima
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Raul Graham, Oficina de Difusion, INIAA/Peru
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Alejandro Hurtado, CTTA/Peru Radio Programmer, Huaraz
Maximo Jara, Treasurer, Comunidad de Recuay-Huanca
Pedro Jara, ex-President, Comunidad de Recuayhuanca, Sector Wapra
Jose Ignacio Mata, CTTA/Peru Project Director
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David Nunez, Asesor, Technology Transfer, INIAA/Lima
Martin Openshaw, NCSU/MIAC Mission to Peru
Mario Pelaez, Chief, INIAA/Lima
Roger Quevedo, Asesor de la Jefatura, INIAA/Lima
Jose Rios, Regional MOA Director, Ancash
Erhardt Ruprecht, Chief, USAID Office of Agriculture and Rural Development
Robert Seminario, Programador del Proyecto ATT, INIAA
Eugenio Tadeo, Vice Presidente, Comunidad de Vicos
Mario Tapia, Former Director, Proyecto PISA

Field Interviews

President, former President, and eight co-op members of the Agrarian Reform Cooperative
"Primero de Mayo"
Seven members of the Comité Agrícola "Los Amigos"

Appendix B
Country Contexts and Comparative Extension Modes

Political-Economic Contest of Country Projects Evaluated

Honduras

Throughout the 1970's, overall real growth rates (GNP per capita) were favorable at an average in excess of 6%. This growth resulted from domestic industrialization, increased exports to Central America, increased investments in the private sector, and foreign-assistance loans and grants. The agricultural sector -- including agricultural production, input suppliers, food processors and distributors plus public services to agriculture -- accounts for a large share of Honduras' GNP. However, real growth rates in this sector failed to exceed the annual population rates of 2.8% to 3.0% throughout the 1970's.

During the 1980's, overall real growth rates have declined. The general world recession, the oil crisis of 1979, the inability of Central American importers to pay for Honduran exports, and the country's involvement with Nicaraguan problems -- all worked to create this decline. The country's present situation can be characterized as one of general recession with severe balance of payment problems, budget deficits, declining employment, and increasing malnutrition. Consequent austerity policies in the 1980's have focused on maintaining fixed exchange rates, low inflation, and low public investment with little operational support for public programs. Without large infusions of foreign aid, the economy would have recorded even poorer levels of economic growth.

Like most Central and some South American countries, the current economic situation in Honduras is related to an unfortunate mix of policies in place since the 1960's or earlier. In general terms these include: relative neglect of the agricultural sector, heavy dependency on a set of policies for industrial import substitution, strong preference for price and exchange rate stability, great dependence on foreign as versus domestic sources of investment, and an expansion of the public as versus the private sector to increase employment. In general these policies have persisted into the late 1980's; they explain the nation's poor economic performance.

Peru

Throughout the 1970's, economic and agricultural growth rates in Peru occasionally exceeded population growth rates. In 1984 and 1985 agricultural growth rates were quite favorable; but overall annual real economic growth rates were only 2% to 3%. In the last two to three years, there have been negative growth rates, high inflation rates reaching over 900% in 1988 (some estimates suggest 2000%), increasing public deficits, declining public investments, substantial shifts in food consumption patterns (e.g., substitution of grains and tubers for poultry, fish, and meat), and absolute austerity for all public programs.

In addition, Peru has pursued policies that have eliminated most forms of external assistance. Among still other factors, the economic disaster in Peru is related to: unworkable international financial policies, unsustainable subsidy and income-transfer policies,

irresponsible monetary and fiscal policies, overburdened levels of public employment, and proliferation of public enterprises. As in Honduras, policies of industrial import substitution, relative neglect of agriculture, and dependency on public versus private employment generation have confounded both present and future economic prospects.

This dismal economic situation is exacerbated by the destructive actions of political groups attempting to overthrow Peru's fragile democratic processes. The political violence and resulting insecurity have also led to capital flight and extremely low levels of foreign investment. Except for some growth in exports, including agriculture, the country is an economic disaster.

T&V, Conventional Extension, and CTTA Compared

In an admittedly somewhat subjective fashion, this section reports on selected qualitative and quantitative measures of output for three modes of transfer/extension: T&V, conventional extension with some communications support, and the CTTA technology transfer process. There are other modes, such as the research/extension liaison unit and the contact/neighbor extension programs being implemented in Ecuador and Guatemala, respectively. These are not included in the comparison because data on their outcome are even fewer than for the three selected modes.

The criteria chosen for this preliminary and illustrative comparison include: changes in attitudes (confidence, credibility, and motivation); physical outputs (yields, net farm incomes, etc.); changes in knowledge or capacity among individual farmers, extensionists, and institutional leaders; and technology transfer components.

Training and Visit (T&V)

During 1987, this transfer mode was being implemented in over 40 developing countries on a national or project basis (Benor and Baxter 1984, Feder et al. 1987). Major features of the T&V system include a high ratio of agents to farmers, bi-weekly training of field extensionists by subject matter specialists, a regularly scheduled set of visits to contact farmers who in turn extend knowledge to neighboring farmers, close supervision by extension leadership, provision of motorbikes or other forms of mobility along with adequate operational support, and agents' exclusive devotion to extension.

As reported by Benor and Baxter 1984, Feder et al. 1987, and others, the costs of establishing and maintaining the T&V system are relatively high. Between 1980 and 1985 the World Bank supported many T&V systems where the total costs were about \$200 million per year. But few extension systems in the developing have annually budgets of even 10% to 20% of this amount.

T&V includes a feedback process from farmers to specialists to researchers. The system is flexible in incorporating group meetings, demonstrations, selected communication strategies, and a calendarizing of problem sets by crops. In some locations, T&V selects priority communities; and contact farmers in each location are carefully selected as representative change agents.

Conventional Extension

In this mode, extension is generally organized as a division within a national institution responsible for generating and extending agricultural technologies. The extension division operates nationally with regional and local agencies, a corps of extension specialists, a communications department within the extension division, modest feedback processes linking extension agents to researchers, a low ratio of agents to farmers, and usually an

assignment of some non-educational functions to field extension agents. In most countries the extension plan calls for national coverage with little prioritization of communities, agencies, or techniques.

In general terms, agents have poorly programmed work plans, low salaries, mal-structured career ladders, little operational support and very modest transport. Moreover, they are subject to frequent political interventions and have low status as compared with researchers.

In many developing countries, national extension programs are organized as a part of national commodity programs. Typically, there is an excessive number of such programs with inadequately trained and supported staff.

The CTTA Process

Although this has already been detailed in the body of this report, several salient characteristics of the process are reiterated here.

The process starts with a selection of locations; a needs assessment or developmental investigation is completed; communities, commodities, and relevant technologies are prioritized; a diffusion strategy is developed and implemented; periodic formative evaluations assess the strategy's strengths and weaknesses; the process provides for a continuous feedback; and, as part of the diffusion strategy, training activities are held with farmers, extensionists and institutional leaders. Another important characteristic of the CTTA process is the inclusion of expert agricultural communicators as equal participants in all components.

Summary

Unfortunately, all of the extension modes discussed above have failed to develop some critical linkages. These include linkages with public or private educational institutions, with input suppliers and product handlers, and with the communications and training departments of the International Agricultural Research Centers.

Table 5 summarizes and compares selected output criteria for the three extension modes. This comparison is preliminary because time does not permit compiling a more complete data base. But even such an initial analysis illustrates the kind of useful product that could result from an in-depth study of different extension modes.

Table 7's comparisons are based on data assembled from: selected publications on the T&V system like those referenced above; published and unpublished reports on the evaluation of extension projects conducted by INIAA/INIPA in Peru (Carasco Gutierrez and Openshaw 1985, 1987, 1989a&b), which contain extensive data in terms of the number of locations, crops, value added, etc.; a report on an ex-ante evaluation of research and extension in Peru that assumes a conventional extension approach in estimating of internal

rates of return (Norton Ganoza and Pomareda 1987); verbal reports and/or preliminary results from CTTA formative and summative evaluations in both Honduras and Peru; the findings of this evaluation team on the CTTA process; and the team's overall experiences gathered from many publications and visits related to agricultural technology transfer activities.

Table B-1: Preliminary Comparisons of Selected Output Criteria for Three Agricultural Extension Modes

Output Criteria	Extension Modes		
	T & V System	Conventional Extension	CTTA Process
Attitude Changes			
Confidence between farmers and extensionists	n.a.	very modest	very favorable
Confidence between extensionists and extension directors	n.a.	little to none	very favorable
Confidence between extensionists and researchers	n.a.	very modest	very favorable
Motivation of extensionists	n.a.	poor	good to very good
Motivation of extension directors	n.a.	poor	good to very good
Credibility with farmers	n.a.	modest	very favorable
Capacity Changes			
For individual farmers	modest	modest	very favorable
For extension agents	favorable	poor to modest	very favorable
For regional extension directors	modest	modest	favorable
For national extension directors	modest	very modest	favorable
Physical Output Changes			
Yields per hectare	+ 5.1%-13.9% ⁴	+ 3%-6% ⁵	+ 6%-10% ⁶
Net farm incomes	n.a.	n.a.	n.a.
Quality of physical output	n.a.	n.a.	qualitative evidence
Cost/benefit ratios	+ 15%-18% ⁴	n.a. ⁷	n.a.
Adoption rates			
Comparison of Components			
Developmental investigation	none	none	integral component
Formative evaluations	none	special studies	integral component
Feedback mechanisms	modest	modest	very favorable
Communications components	partial involvement	partial involvement	integral component

¹ "Extensionists" refers to field or agency-level personnel.

² Not available (n.a.) from limited bibliographic search, but ongoing World Bank studies may provide estimates.

³ Capacity changes refers to organized training programs as a component of the overall strategies.

⁴ Feder et al., 1987.

⁵ Carrasco, Gutierrez, and Openshaw, 1985 and 1987.

⁶ Based on verbal reports of findings from the Honduras summative evaluation.

⁷ Norton et al., 1987, and others estimated internal rates of return to research and extension in Peru ranging from 17% to 38% under varying assumptions. There are no known estimates of internal rates of return for the extension component.

⁸ Estimated from reports on the formative evaluation.

Appendix C

CTTA Training and Diffusion Outputs

TABLE C-1 TRAINING, WORKSHOPS, PRESENTATIONS: C.T.T.A. PROJECT - HONDURAS - 1986-87-88-89

DATE	TYPE OF EVENT	PLACE	NUMBER AND STATUS OF PARTICIPANTS	ISSUES DEVELOPED IN THE PRESENTATION
12/86	Workshop	Tegucigalpa	17 Researchers	Two-day workshop in field research techniques and data compilation and analysis
1/87	Training	Tegucigalpa	18 DCA Staff	Two-week intensive course in radio production involving promotion materials, formats, and use of procedural manuals.
2/87	Conference	Tegucigalpa	25 DCA Staff	Introduction to the topic: Programming by Projects.
3/87	Internal Training	Tegucigalpa	32 DCA Staff	Internal weekly training initiated: Analysis of the Communication Process.
4/87	Internal Training	Tegucigalpa	31 DCA Staff	On-going weekly sessions included internal communications, technical guide in corn, basic principles of writing, use of a/v materials.

5/87	Media Training	Tegucigalpa	17 DCA Staff	Training activities and follow-up support in specific projects related to celebration of "Natural Resources Week".
5/87	Internal Training	Tegucigalpa	10 DCA Staff	Training for CEDIA personnel regarding work through projects
6/87	Internal Training	Tegucigalpa	23 DCA Staff	Weekly training brings in-creased output; results presented to MNR
7/87	Internal Training	Tegucigalpa	32 DCA Staff	On-going weekly training
8/87	Internal Training	Tegucigalpa	34 DCA Staff	On-going weekly training
9/87	Internal Training	Tegucigalpa	33 DCA Staff	On-going weekly training
10/87	Internal Training	Tegucigalpa	34 DCA Staff	On-going weekly training
11/87	Seminar-Workshop	Las Lajas	Siguetepeque	39 MNR Extensionists Building on DCA training, extensionists learned to draft project proposal and use mass media to improve contact with farmers
12/87	Seminar-Workshop	La Paz La Villa de San Antonio Comayagua Ajuterique	23 MNR Extensionists	Program similar to 11/87 seminar; all MNR extensionists from Comayagua region now trained by CITTA

1/88	Internal Training	Tegucigalpa	10 DCA Staff	On-going weekly training
2/88	Internal Training	Tegucigaipa	22 DCA Staff	On-going weekly training
3/88	Internal Training	Tegucigalpa	1 DCA Staff	On-going weekly training
4/88	Orientation	Comayagua	13 New CTTA Staff	CTTA "new arrivals" briefed and trained in duties and methods
4/88	Internal Training	Tegucigalpa	25 DCA Staff	On-going weekly training
5/88	Mass Media Train.	Tegucigalpa	15 MNR Staff	Two-week communications training for Danli Region DCA, focusing on CTTA method of integrating mass media, radio and graphics in support of technology transfer
5/88	Internal Training	Tegucigalpa	18 DCA Staff	On-going weekly training
6/88	Internal Training	Tegucigalpa	30 DCA Staff	On-going weekly training
7/88	Mass Media Train.	Comayagua	15 DCA Staff	Further training in communications for Danli Region personnel
7/88	Seminar-Workshop	Olanchito	30 Extensionists Researchers	CTTA joined MNR officials to train MNR regional field workers in integrating various types of communications technology with MNR services
7/88	Internal Training	Tegucigalpa	35 DCA Staff	On-going weekly training

8/88	Internal Training	Tegucigalpa	16 DCA Staff	On-going weekly training
9/88	CTTA Method Train.	Comayagua	12 Veterinarians	CTTA oriented veterinarians from Olanchito, Santa Rosa, and La Esperanza in use of CTTA methods w/in PROFOGASA Project.
9/88	Internal Training	Tegucigalpa	16 DCA Staff	On-going weekly training
10/88	Conference	El Zamorano	24 Extensionists	CTTA presented panel "Communication and Transfer of Agricultural Technology" as part of ICCA Course VI in Central American Coffee Production
10/88	Internal Training	Tegucigalpa	45 DCA Staff	On-going weekly training
11/88	Seminar-Workshop	Olanchito	30 Extensionists Researchers	Second seminar on integrating research, extension and communication methods in technology transfer projects
11/88	Internal Training	Tegucigalpa	2 DCA Staff	On-going weekly training
12/88	Internal Training	Tegucigalpa	25 DCA Staff	On-going weekly training
1/89	Research	Tegucigalpa	3 Students	Advice on MA thesis
1/89	Internal Training	Tegucigalpa	5 DCA Staff	On-going weekly training

1/89	Conference	Danli	17 MNR Regional Directory	Presentation of MNR's Unified Methodology
2/89	Research-Education	Tegucigalpa Comayagua El Zamorano	9 Extension Students	Agreement established between CTTA and Escuela Agricola Panamericana (EAP) to train extension students in CTTA methods and gain practical experience through EAP's Rural Development Project
2/89	Internal Training	Tegucigalpa	10 DCA Staff	On-going weekly training with special emphasis on applied statistics in communication research
3/89	Research-Education	Tegucigalpa	ENA Students	Agreement planned to involve CTTA in training extension students from National School of Agriculture (ENA)
3/89	Internal Training	Tegucigalpa	6 DCA Staff	Special A/V training
3/89	Seminar-Workshop	Comayagua	8 New	CTTA Staff Orientation in use of MNR's Unified Methodology (integrated research, extension, communication)
3/89	Seminar-Workshop	Comayagua	45 PROFOGASA	Training in use of communication in livestock technology transfer projects.

3/89	Seminar-Workshop	Olanchito	20 PROFOGASA	Same as above
3/89	Seminar-Workshop	Ajuterique	7 Extensionists Researchers	Training in developmental investigation
3/89	Research-Education	El Zamorano	9 EAP Students	CTTA-sponsored seminar in connection with EAP's Rural Development Program
4/89	Seminar-Workshop	Comayagua	22 MNR Staff	Training MNR extentionists in use of various forms of communications in technology transfer projects
4/89	Seminar-Workshop	Tegucigalpa	22 MNR Staff	Similar to above format with use of photography
4/89	Seminar-Workshop	San Luis	6 Extensionists	Training in selection of communication strategies for 1989 technology transfer projects

TABLE C-2 TRAINING, WORKSHOPS, PRESENTATIONS: C.T.T.A. PROJECT - PERU - 1986-87-88-89

DATE	TYPE OF EVENT	PLACE	NUMBER AND STATUS OF PARTICIPANTS	ISSUES DEVELOPED IN THE PRESENTATION
2/86	Presentation	INIPA-Lima	30 Chiefs and Directors of Programs and Departments	CTTA methodological process and objectives
3/83	Presentation	AID-Lima	15 Program Officers and Administrators	CTTA methodological process and objectives
3/86*	Presentation	Ministry of Agriculture of Ecuador	25 Chiefs and Directors of Programs	CTTA methodological process and objectives
6/86*	Presentation	OCT/INIPA-Lima	18 OCT technicians	CTTA methodological process and objectives
7/86*	Presentation	CIPA III-Chiclayo	20 OCT technicians	CTTA methodological process and objectives
8/86	Presentation	INIPA-Lima	25 Program Officers	Methodologies and strategies for technical communication
8/86	Presentation	C I P A X I I - Huancayo	14 OCT technicians	CTTA methodological process and objectives

8/86	Workshop	C I P A X I I - Huancayo	10 OCT technicians	Design and validation of educational materials
11/86*	Workshop	C I P A X V - S a n Martin	15 OCT technicians	Techniques for designing education materials
1/87	Presentation	C I P A V - H u a r a z	6 OCT technicians	CTTA methodolgal process and objectives
1/87*	Presentation	C I P A V - H u a r a z	20 Researchers	CTTA methodological process and objectives
1/87*	Presentation	C I P A V - H u a r a z	10 investigators	CTTA methodological process and objectives
2/87*	Presentation	C I P A V - H u a r a z	15 Interviewers	Techniques of social research
3/87*	Presentation	C I P A V - H u a r a z	32 Extensionists	Coordination of CTTA methodology and extension programs
4/87*	Workshop	C I P A V - H u a r a z	37 Participants of INIAA, CORDE, Ministry of Agri- culture and Uni- versity of Huaraz (UNASAM)	Techniques of social research
6/87*	Workshop	C I P A V - H u a r a z	20 Interviewers	Techniques of social research

6/87*	Workshop	CIPA V-Huaraz	16 Participants of different CIPA's and local institutions.	Techniques of educational radio
7/87	Workshop	CIPA V-Huaraz	4 Graphic artists	Techniques of educational graphic design
11/87*	Workshop	OCT-Lima	8 Participants	Coding of research instruments
11/87*	Presentation	INIAA-Lima	45 Program directors, specialists, and researchers	CTTA Strategy and Action Plan
12/87*	Workshop	CIPA V-Huaraz	10 Interviewers	Techniques for social evaluation research
3/88	Presentation	INIAA-Lima	15 Participants, Head of INIAA and Program Directors	CTTA strategy and activities in the pilot area
4/88	Presentation	CIPA V-Huaraz	20 Participants, Head of INIAA, advisors, specialists, and program directors from Lima and Huaraz	Report on CTTA results in the pilot area

5/88	Workshop	Lima	40 participants of Peru and Colombia technology transfer institution	CTTA methodology, strategy, and findings
6/88*	Presentation	INIAA-Puno	18 participants, specialists, and program directors	CTTA methodology, objectives, and strategies
6/88*	Presentation	INIAA-Puno	23 participants, specialists, and program directors	Same as above
7/88*	Workshop	Recuayhuanga	35 Farmers	Course about technologies for potatoes
8/88*	Presentation	PLAN SIERRA conference-Lima	Participants from national and international institutions	Comparison of CTTA methods and others
8/88	Workshop	Vicos	60 Farmers	Course about technologies for maize
9/88*	Workshop	Recuayhuanga	60 Farmers	Course about technologies for potatoes
9/88*	Presentation	Technology Transfer Workshop-Lima	14 International Advisors from FAO, AID, and non-governmental organizations	Findings and experience of CTTA

9/88	Workshop	Vicos	70 Farmers	Course about technologies for potatoes
10/88*	Workshop	Recuayhuanga	75 Farmers	Course on livestock
10/88*	Workshop	Recuayhuanga	31 Women	Course on guinea pigs
10/88*	Workshop	Recuayhuanga	100 + entire community	Training/practice in livestock vaccination
10/88*	Presentation	AID-Lima	15 Project officials	Strategy, activities, and findings of CTTA
11/88*	Presentation	Vista Florida experimental station-Chiclayo	15 Specialists, program officers, and technicians	Strategy and findings of CTTA
11/88*	Training wkshp	INIAA-Puno	20 Interviewers	Training for Developmental Investigation
12/88*	Training wkshp	INIAA-Chiclayo	20 Interviewers	Same as above
2/89*	Presentation	INIAA-Lima	5 Agronomists	CTTA for identifying and adjusting technologies
3/89	Presentation	COTESU-Puno	5 Administrators Technical advisors	CTTA technology transfer strategy
3/89	Presentation	Coordination of ATT project	2 Technicians	CTTA strategy in Huaraz, Chiclayo, and Puno

3/89	Presentation	FONAGRO	5 General Manager and directors	CTTA proposal for technology transfer in the private sector
3/89*	Presentation	INIAA-Chincha	22 participants of INIAA, MNR, Agrarian Bank	CTTA objectives, process, and strategies
4/89*	Workshop and field practice	Recuayhuanga	25 Farmers	Potatoe pest control
4/89*	Workshop and field practice	Copa Chico	80 Farmers	Potatoe pest control
5/89	Workshop	F O N A G R O - Chincha	3 Technicians	Graphics and radio production techniques
5/89	Presentation	F O N A G R O - Chincha	20 Technicians, researchers, directors	Strategy for promoting private technical assistance based on CTTA methods
5/89	Presentation	MOA-Chiclayo	5 Director and extensionists	CTTA technology transfer strategy
5/89	Presentation	Chiclayo	7 Extensionists	Same as above
5/89	Presentation	Lima	2 Heads of PISA project	CTTA approach in Huaraz, Chiclayo, and Puno

Planned Events

6/89	Presentation	Huaraz-CAU La Esperanza	12 Technicians of private enterprise CAU La Esperanza	Strategy for promoting private technical assistance for enterprises of FUNDEAGRO
7/89	Workshop	Chiclayo-Vista Florida Experimental Station	OCT technicians and staff	Graphics and radio production techniques
8/89	Workshop	Puno	OCT technicians and staff	Same as above
9/89	Workshop	Chiclayo	PIST technicians and staff	Social research techniques and design strategies
10/89	Workshop	Puno	Same as above	Same as above
11/89	Workshop	Chiclayo	Same as above	Same as above

TABLE C-3 OUTREACH AND DIFFUSION : C.T.T.A. PROJECT - HONDURAS -1986-87-88-89

DATE	LOCATION	TYPE OF OUTREACH	DESCRIPTION
1/87	Tegucigalpa	Print Media	Published first edition of "Enlace Agropecuario," a CU newspaper designed for distribution to MNR and related agrosupport institutions
2/87	Comayagua	Meetings	CTTA promotion increased through visits to three extension agencies in the area
3/87	Various	Meetings	Further CTTA promotion through visits to extension agencies in four additional regions
4/87	Comayagua	Radio	Daily broadcast of four pre-tested PSAs (60-sec.) on soil conservation
4/87	Comayagua	Seminars	CTTA personnel participated in Regional Seminar of Research and Extension; also took part in panel discussion, "Farming Systems in Comayagua"
4/87	Comayagua	Presentation	Advance version of initial developmental investigation results presented to regional extension agents and researchers
5/87	Comayagua	Meetings	DCA and CTTA liaison achieved full integration of extensionists into CTTA research projects
5/87	Comayagua	Radio	Production/pre-testing of three new radio spots including PSAs on soil conservation and initial promotion of "Ingeniero Martin" persona
5/87	Tegucigalpa	Media Campaign	CTTA cooperated in various projects related to one week celebration of "Natural Resources Week," including preparation of radio spots, a pamphlet and two posters

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6/87	Tegucigalpa	Presentation	Participated in interinstitutional meeting on Basic Grains Production in Honduras; presented on "Communication Support to the Basic Grains Program"
6/87	Tegucigalpa	Print Media	New edition of "Enlace Agropecuario" published
6/87	Tegucigalpa	Media Campaign	Support for "Medfly" (Mosca del Mediterraneo) campaign managed by MNR's Vegetable Protection Section
6/87	Comayagua	Print Media	Regional MNR researchers prepared technical guides for cultivation of tomatoes, onions, beans, soy-beans and watermelon
6/87	Comayagua	Radio	Diffusion of three new radio spots on soil conservation
6/87	Comayagua	Meetings	CTTA contact with extensionists in La Esperanza and Olancho regions
7/87	Comayagua	Radio	Broadcast of "La Milpa," the agricultural radio program produced by CTTA in Comayagua, was initiated; show to air daily (M-F) from 4:00-4:14 p.m.
7/87	Comayagua	Meetings	Further technical guides designed for Comayagua region based on meetings with Directors of the region's ten extension agencies
7/87	Olancho	Meeting	Participated in National Extension Meeting involving local, regional and nation MNR officials
8/87	Comayagua	Presentation	CTTA methodology and specific projects presented to various MNR officials during supervisory visit

8/87	Las Lajas	Meeting	Participated in initial planning session for extension activities in this region
9/87	Comayagua	Flyers	Three flyers ("hojas divulgativas")--on soil preparation, planting, and bean varieties--were produced and distributed to farmers of El Rosario, San Luis and San Jeronimo
9/87	Las Lajas	Radio	Broadcast of "La Milpa" initiated in these regions; La Villa dereport of feedback on program from farmers of El San Antonio Rosario
10/87	Ajuterique	Meeting	Initial contact made with local extension agency
10/87	Comayagua	Flyers	Four new flyers--on proper use of fertilizers, weeding, and bean crop pest control--produced and distributed through extension agencies and commercial stores in region; seven "hojas divulgativas" distributed with positive farmer response
10/87	Tegucigalpa	Print Media	New edition of "Enlace Agropecuario" was published
10/87	Tegucigalpa	Reports	CTTA input on MNR's report "Una Estrategia para la Generacion y Difusion de Tecnologias" is well received by MNR Director of Extension, promoting institutionalization of CTTA methodology CTTA prepared document "Modelos de Comunicacion Aplicadas a la Transferencia de Tecnologia", to be used in training for MNR extensionists
11/87	San Luis	Meeting	CTTA project evaluated by USAID representatives and top official from Ministry of Finance; input from local farmers contributed to positive evaluation

11/87	Comayagua	Flyers	Two new flyers--on bean crop pest control--were distributed, completing the production cycle of nine "hojas divulgativas"
11/87	El Zamorano	Presentation	CTTA invited to present on project activities at the Escuela Agricola Panamericana (EAP) and the Escuela Nacional de Agricultura (ENA) with 150 participants
11/87	Tegucigalpa	Seminar	CTTA joined MNR General Director of Livestock in a seminar on internal communication within the Direccion General de Ganaderia (DGG); DCA asked to participate in subsequent communications activities at DGG, further insuring CTTA institutionalization
12/87	Comayagua	Radio	Continued production of "La Milpa," with content now reinforcing messages related to bean production
12/87	Comayagua	Meetings/Briefing	USAID/H Mission Director reviewed CTTA project and expressed interest in linking CTTA with AVANCE group, which publishes "El Agricultor" newspaper; also, initial liaison with Honduras Irrigation Development Project for communications teamwork in Comayagua
12/87	Tela	Conference	CTTA participated in National Congress of Extension, presenting a paper "Reflexiones Sobre el Proceso de Generacion y Transferencia de Tecnologia en la Secrateria de Recursos Naturales"; contact made with MNR's Regional Directors for Olancho and North Region (San Pedro Sula) about CTTA expansion
1/88	Tegucigalpa	Meetings	Institutionalization of CTTA methods furthered by meetings w/incoming USAID/H Agricultural Office Chief; Extension Consultant of PRORIEGO irrigation project; AVANCE representatives regarding coordination at various levels

1/88	Tegucigalpa	Report	MNR Annual Report published with CTTA cooperation
2/88	Tegucigalpa	Committee	CTTA named to committee charged with evaluating SIPCAR, an institution responsible for training agricultural officials? in A/V technologies
2/88	Tegucigalpa	Print Media	New edition of "Enlace Agropecuario" produced, including special CTTA article "Transparencias no Fotograficas," which is oriented to extensionists and explains use of non-photographic slides
3/88	La Paz Flores Taulabe Comayagua Siguatepeque	Presentations	CTTA officially expanded to all extension agencies in Comayagua Region with initial presentations these communities
3/88	Comayagua	Radio	"La Milpa" format reinitiated to contain following sections: Agronoticias, Conversando con los Agricultores, La Entrevista de Hoy and Correo Campesino; irrigation schedule for Comayagua valley diffused through program
3/88	Tegucigalpa	Print Media	New edition of "Enlace Agropecuario" published
3/88	Tegucigalpa	Report	Document "Politicias Para la Production y Reglamentacion de Publicaciones Impresas" published by DCA
4/88	Tegucigalpa	Radio	Initial broadcast of "Amanecer Agropecuario," a national radio agricultural program; information on agriculture, livestock production and protection of natural resources; broadcast Saturdays 5:30-6:30 am

4/88	Tegucigalpa	Report	Statistical report from Extension Agency of San Luis revealed farmers have increased their income from rice production by using the technologies diffused by CTTA and the extension service
4/88	Tegucigalpa	Graphics	CTTA supported production of new graphic materials as part of MNR's national campaign to promote production of basic grains
5/88	San Luis	Bulletin	"El Cultivo Del Maiz," a didactic bulletin related to corn crop, produced and distributed through local extension agency
5/88	Comayagua	Lecture	Lecture describing CTTA methods, entitled "The Communication Process," offered as part of two-week training course for DCA media production personnel
5/88	Comayagua	Radio	Continued daily broadcast of "La Milpa"
5/88	Tegucigalpa	Radio	Continued weekly broadcast of "Amanecer Agropecuario"
6/88	San Luis San Jeronimo	Bulletin	"El Cultivo Del Arroz," a didactic bulletin related to rice crop, produced and distributed to farmers
6/88	Comayagua Flores Ajuterique El Rosario	Bulletin	"El Cultivo Del Maiz" produced and distributed to farmers
6/88	Comayagua	Meeting/Briefing	Top USAID/W official visiting Honduras received complete update on CTTA activities and toured Comayagua region

6/88	Comayagua	Radio	Continued daily broadcast of "La Milpa"; success indicated by increasing mail from farmers throughout Comayagua Valley
6/88	Tegucigalpa	Radio	Continued weekly broadcast of "Amanecer Agropecuario"
6/88	Tegucigalpa	Committee	CTTA personnel involved in planning team for LUPE project
7/88	San Luis	Meeting/Briefing	Director of USAID/H Agriculture Office toured San Luis Agency; CTTA presented information detailing increases in rice production following involvement of CTTA Project
7/88	San Jeronimo	Bulletin	"El Cultivo Del Maiz" produced and distributed to farmers
7/88	Comayagua	Radio	Continued daily broadcast of "La Milpa"; increasing flow of letters from farmers satisfied with results
7/88	Tegucigalpa	Radio	Continued weekly broadcast of "Amanecer Agropecuario"
7/88	Tegucigalpa	Technical Guide	"Guia para la Elaboracion de Proyectos de Transferencia" published
7/88	Tegucigalpa	Meetings	Initiated by correspondence from MNR's Livestock General Directorate, CTTA met twice for liaison and planning with technical personnel from Livestock; CTTA's assistance sought on PROFOGASA Project
8/88	Tegucigalpa	Media Campaign	CTTA involved in planning/preparation of MNR's national campaign to increase bean production in "postrera"; activities include production of printed matter as well as radio programs
8/88	Tegucigalpa	Policy Documents	CTTA prepared two documents justifying use of MNR's Unified Methodology in LUPE Project

8/88	Tegucigalpa	Radio	Continued weekly broadcast of "Amanecer Agropecuario"
8/88	San Jeronimo	Bulletin	"El Cultivo Del Arroz" produced and distributed to farmers
8/88	Las Lajas Taulabe	Bulletin	"El Cutivo Del Maiz" produced and distributed to farmers
8/88	Comayagua	Radio	Continued daily broadcast of "La Milpa"
9/88	Comayagua	Presidential Tour	Honduran President Jose Azcona Hoyo visited Comayagua Region with executive staff; CTTA helped produce various briefing materials, including pamphlets, slides for A/V presentations, etc.; the president toured the region, received copies of all materials distributed to farmers, and tuned into "La Milpa"
9/88	Comayagua	Radio	Continued daily broadcast of "La Milpa"
9/88	Comayagua	Media Campaign	CTTA involved in MNR's effort to promote activities at community level; CTTA contributed to production of graphics, printed matter and radio spots disseminated through "La Milpa"
9/88	Comayagua	Meeting/Briefing	USAID/W official visited CTTA's Comayagua Project
9/88	Tegucigalpa	Meetings	CTTA personnel involved in planning National Congress of Extension
9/88	Tegucigalpa	Radio	Continued weekly broadcast of "Amanecer Agropecuario"
10/88	El Zamorano	Roundtable	CTTA participated in roundtable discussion on Transfer of Agricultural Technology

10/88	Madison, WI Miami, Fl Washington,DC	Meeting/Briefing	Liaison and updating USAID officials; lectures and Seminars to publicize/disseminate CTTA methods?
10/88	Las Lajas	Media Campaign	Production and distribution of pamphlets on bean crop pest control
10/88	San Jeronimo	Media Campaign	Production and distribution of pamphlets on bean crop
10/88	Comayagua	Radio	Continued daily broadcast of "La Milpa"; development of "Rural Correspondents" plan to increase diffusion at community level
11/88	Comayagua	Radio	Continued daily broadcast of "La Milpa"; focus now on bean production, livestock and soil conservation practices
11/88	La Cieba	Meeting	Liaison and planning regarding set-up of DCA Regional Communication Office
11/88	Tegucigalpa	Meetings	Liaison and planning regarding LUPE Project
11/88	Tegucigalpa	Radio	Continued weekly broadcast of "Amanecer Agropecuario"
12/88	Tela	Conference	CTTA personnel participated in National Congress of Extension, including keynote presentation "Change Agent's Participation in the Rural Development Process" and presentation by MNR official detailing Ministry use of CTTA methods
12/88	Tela	Mural	CTTA created and installed a mural displaying all its activities to date in the Comayagua, San Pedro Sula and Olanchito Regions

12/88	Siguatepeque	Conference	CTTA presented lecture "Reflections on the Process of Technology Transfer in AMIs," detailing integrated use of research, extension and communication in technology transfer projects as part of COHDEFOR National Congress
12/88	Comayagua	Radio	Continued daily broadcast of "La Milpa"
12/88	Tegucigalpa	Radio	Continued weekly broadcast of "Amanecer Agropecuario"
1/89	Comayagua	Survey Results	Radio audience for "La Milpa" increased 14.1 percent (vs. 1987) to an approximate total of 16,025 farmers, according to a survey which will be published as part of an MA thesis being written by a Honduran journalism student
1/89	Comayagua	Radio	Continued daily broadcast of "La Milpa"
1/89	Tegucigalpa	Annual Report	MNR Annual Report produced in record time and with dramatic increase in quality
1/89	Tegucigalpa	Radio	Continued weekly broadcast of "Amanecer Agropecuario"
1/89	Tegucigalpa	Meetings	Liaison and planning of projects with COHDEFOR (forestry), PROFOGASA (livestock), and PRORIEGO (irrigation)
1/89	San Jose	Meetings	Liaison and planning with USAID/Costa Rica officials
1/89	Danli	Meetings	Consulting on MNR project to establish regional communication office grounded in CTTA integrated methods
1/89	Santo Domingo	Meetings	First meeting of AED Field Directors in Latin America

2/89	La Esperanza	Radio	Broadcast of new show "Adelante Campesino" initiated; airing daily (M-F) from 3:00-3:30 pm, program features information on potatoes, corn, wheat vegetables, beans and livestock production and has a target audience of 2,000
2/89	Comayagua	Radio	Continued daily broadcast of "La Milpa"
2/89	Tegucigalpa	Radio	Continued weekly broadcast of "Amanecer Agropecuario"
2/89	Tegucigalpa	Meetings	Liaison and budget planning with USAID/H and Ministry of Finance Officials
3/89	Taulabe	Election	Ruben Dario Cruz Doblado elected first Rural Correspondent for "La Milpa" from El Carrizal, Taulabe in the Comayagua region
3/89	Tegucigalpa	Radio	Continued weekly broadcast of "Amanecer Agropecuario"
3/89	Tegucigalpa	Meetings	Liaison and planning regarding PROFOGASA
3/89	Comayagua	Radio	Continued daily broadcast of "La Milpa"
3/89	La Esperanza	Radio	Continued daily broadcast of "Adelante Campesino"
4/89	Olanchito Chuloteca Cieba Danli	Meetings	Planning to establish DCA Regional communications offices
4/89	Comayagua	Radio	Continued daily broadcast of "La Milpa"
4/89	El Taladro	Meetings	Liaison with farmers to establish "La Milpa"'s Rural Correspondents

TABLE C-4 OUTREACH AND DIFFUSION: C.T.T.A. PROJECT - PERU - 1986-87-88-89

Date	Type of Outreach	Place	Description
8/86	Report	Huancayo	Initial report on farming methods, socio-cultural patterns and overview of plan to improve pest control in the Peruvian Sierra by integrating radio messages, printed matter, and technical assistance
1/87	Interviews	Huaraz	In connection with developmental investigations CTTA researchers interviewed 250 farmers
1/87	Technical report	Huaraz	"Informe Tecnico No. 1" - report on selection of Huaraz pilot area and strategies for transferring technology
2/87	Technical report	Huaraz	"Informe Tecnico No. 2" - results of developmental investigation and initial outline of approach to improving pest control in Huaraz region with CTTA integrated plan
3/87	Technical manuals	Huaraz	Manuals on corn, potatoes, and wheat prepared for use in training extensionists
7/87	Interviews	Huaraz	In connection with the summative evaluation CTTA interviewed 550 farmers
7/87	Technical reports	Huaraz	"Informe Tecnico No. 3" - detailed plan of action for first stage of CTTA project (7/87-7/88)
7/87	Radio spots	Huaraz	Production of first three radio spots on corn and potatoes; diffusion on daily basis through 1/88

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7/87	Radio programs	Huaraz	Regular daily production of "Amanecer Campesino" begins with announcer Don Hilaco talking with farmers about a range of topics; subject matter changes according to monthly schedule
8/87	Flyers	Huaraz	First three "hojas volantes" (flyers) produced and distributed (quantities indicated): <ul style="list-style-type: none"> ■ Planting distance (2000) ■ Corn crop fertilization (2000) ■ Taking soil samples
8/87	Radio	Huaraz	Production of three new PSA's (60 seconds) in connection with this month's flyers
9/87	Flyers	Huaraz	Production/distribution of two new flyers (quantities indicated): <ul style="list-style-type: none"> ■ Soil analysis (2000) ■ Tilling of corn (2000)
9/87	Radio	Huaraz	Production of two new PSA's (60 seconds) in connection with this month's flyers
10/87	Radio	Huaraz	Production of two new PSA's (60 seconds) on potatoe fertilization and pest control of "papa kuru" (andean weevil)
11/87	Radio	Lima	Production of two PSA's (60 seconds) on potatoe and corn pest control Production of three editions of CTTA radio program "Amanecer Campesino" (15 minutes), with announcer Don Hilaco talking to farmers about pest control

11/87	Flyers	Lima	Production/distribution of new flyers on various topics (quantities indicated): <ul style="list-style-type: none"> ■ Aporque and second fertilization in corn (5000) ■ Fertilization doses in corn in the Callejon de Huaylas (2000) ■ How to handle and use the pesticides (2000) ■ How to control the papa-kuru (2000) ■ How to control the potatoe pests (2000)
11/87	Flyers	Huaraz	Production of two new PSA's (60 seconds) on potatoe and corn crop pest control
12/87	Radio	Huaraz	PSA's broadcast daily; "Amanecer Campesino" broadcast weekly (Saturday)
12/87	Flyers	Huaraz	Distribution of flyers continues
1/88	Radio	Huaraz	Broadcast schedule of PSA's and program continues
2/88	Radio	Huaraz	Broadcast schedule continues; introduction of new PSA on ground preparation for wheat crop
2/88	Meetings	Huaraz	Liason between CTTA and INIAA; development of plans to extend CTTA throughout country
2/88	Radio spots	Lima	Production/Distribution of two new PSA's (60 seconds) on wheat crop pest control
2/88	Flyers	Lima	Two new flyers on potatoe crop pest control
3/88	Radio	Huaraz	Production/distribution of two new PSA's (60 seconds) on wheat crop pest control
3/88	Flyers	Huaraz	Production/distribution of two new flyers on various potatoe crop pest control

4/88	Radio	Huaraz	Broadcast schedule continues
5/88	Technical report	Lima	"Informe Tecnico No. 4" - initial formative evaluation of CTTA
5/88	Technical report	Lima	"Informe Tecnico No. 5" - CTTA second stage plan
7/88	Workshop	Recuayhuanga Vicos Siete Imperios	Radio courses presented to farmers
8/88	Course pamphlets	Huaraz	850 "Guias de Aprendizaje" (Guides for Learning) printed; topic is corn crop pest control!
8/88	Radio Course #1	Huaraz	Production completed on 9 programs (all in Quechua) for lessons on corn crop pest control
8/88	Conference	Huaraz	CTTA advisors participated in panels and working groups at international forum of groups working on PLAN SIERRA (an agriculture extension project)
9/88	Course pamphlets	Huaraz	Distribution of Guides for Learning on corn crop pest control
9/88	Radio Course #1	Huaraz	Course begins as part of daily broadcast of "Amanecer Campesino"
9/88	Int'l Meeting	Lima	Follow-up to PLAN SIERRA forum (8/88); CTTA involved in designing extension and training systems for other communities in Peruvian Sierra
10/88	Meetings/Briefings	Quito California Wash.,D.C.	Liason work with AID, ACT, FUNDEAGRO to publicize/disseminate CTTA methodologies

10/88	A/V presentation	Lima	Liason with new AID official to publicize CTTA proejct and dramatize CTTA-INIAA cooperation (presentation was made with INIAA official)
10/88	Meeting	Huaraz	Plan (with INIAA) expansion to Puno and Chiclayo
11/88	Radio Course #2	Huaraz	New radio programs on potatoe crop pest control
11/88	Course pamphlets	Huaraz	Production of 1000 Guides for Learning for course on potatoe pest control
12/88	Radio Course #2	Huaraz	Daily broadcast of course on potatoe crop pest control
12/88	Course pamphlets	Huaraz	Distribution of Guides for Learning on potatoe crop pest control
1/89	Radio Program	Huaraz	Based on interviews with 180 farmers from Recuayhuanga, vicos, Jose Olaya, and Callejon de Huaylas, "Amanecer Campesino" reports progress in controlling potatoe and corn crop pests; information on pests was part of "Amanecer Campesino"
1/89	Radio program	Puno	"Amanecer Campesino" begins introducing new didactical format based on CTTA developmental investigation of regional farming needs and cultural characteristics; dialy broadcast, with subject matter concerning corn and potato crop cultivation following a monthly diffusion schedule
2/89	Interviews	Huaraz	Researchers interviewed 178 farmers in Copa Chico, Recuayhuanga, Vicos, and Siete Imperios for Huaraz Project formative evaluation
3/89	Technical reports	Lima	Preparation underway for four reports including: <ul style="list-style-type: none"> ■ developmental investigations in Puno ■ integrated action plan for Puno ■ developmental investigations in Chiclayo ■ formative evaluation for Huaraz

3/89	Field Note	Lima	Preparation underway for in-depth analysis of dissemination and local response to technologies in Huaraz project
3/89	Meetings	Lima	To coordinate links between CTTA and private sector groups in Puno (CESPAC) and Chincha (FONAGRO)
4/89	Radio	Huaraz	"Amanecer Campesino" broadcasts continue according to schedule
5/89	Radio	Huaraz	"Amanecer Campesino" schedule continues with cycle of programs on corn and potato crop cultivation