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COMMUNICATIONS FOR TECHNOLOGY TRANSFER IN AGRICULTURE

DRAFT

HONDURAS IMPLEMENTATION PLAN

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I. INTRODUCTION

A. History of Project Development

In April 1983, USAID/Tegucigalpa and the Ministry of Natural Resources jointly sponsored a three-day seminar on Agricultural Communcations funded by USAID/T which included participation from other agencies (the Agrarian Reform Insititute, IHCAFE, Regional Cooperatives, etc.). Seminar participants included national staff of Honduran institutions which provide agricultural extension services to rural farmers, Honduras staff of the above-mentioned institutions who play key roles in planning and implementing programs designed to reach farmers with information to increase their agricultural production and incomes. The seminar focused on the systematic use of radio and other media in carefully designed strategies to supplement existing extension activities.

As a direct result of the seminar, the MNR now places more emphasis on extension and attempts to strengthen the Agricultural Communication Unit (ACU) within the Ministry.

In a parallel activity, USAID/T explored the possibility of supporting the creation of a private agricultural research foundation which would have, among other program objectives, an outreach communication division to improve research-extension-farmer linkages. This has resulted in recent establishment of the Honduran Foundation for Agricultural Research with substantive USAID support.

In March 1984, an assessment was made of agricultural communications in Honduras. Its purpose was to assist USAID/H and the MNR with the preparation of a plan of action through which the Government of Honduras (GOH) could implement its desire to incorporate more effective use of communication technology into the Ministry's agricutural extension programs. Concurrently, a feasibility study was conducted to explore the potential of including a Communication Division within the Honduran Agricultural Research Foundation (FHIA).

In 1983, AID/Washington, Bureau for Science and Technology, Office of Education, began examining the impact which communication campaigns utilizing mass media channels have had in fields such as education (distance teaching), family planning (contraceptives) and health (oral rehydration therapy), and the possible relevance of that experience to agricultural programs. This examination culminated in the development jointly by the Education, Agriculture and Rural Development Offices in the Bureau of Science and Technology of a project paper titled Communication for Technology Transfer in Agriculture (number 936-5826) which was approved in April 1985.

On September 24, 1985, the Academy for Educational Development (AED) signed a contract with the United States Agency for International Devlopment to implement a five year research and design project to develop and demonstrate a more effective communication support system for technology transfer in agriculture. This project is titled Communication for Technology Transfer in Agriculture (CTTA).

B. Participating Institutions

The CTTA project is sponsored by the Offices of Education, Agriculture and Rural Development of the Bureau for Science and Technology of the United States Agency for International Development.

The prime contractor is the Academy for Educational Development (AED). The contractor team also includes two subcontractors: Applied Communications Technology, Inc. (ACT) and Cornell University, with collaborating specialists and faculty from the University of Wisconsin College of Agriculture and Life Sciences, Iowa State University College of Agriculture, Needham Porter Novelli, and Virginia State University.

The CTTA project in Honduras is jointly funded by AID/W and USAID/Honduras. The Honduran implementing organizations are the MNR's Agricultural Communication Unit (ACU/Tegucigalpa), the MNR/Regional Directorate in Comayagua (the region chosen as the site where the CTTA project will develop a pilot project intervention), and the Honduran Agricultural Research Foundation (FHIA). The CTTA project's pilot project intervention in the Comayagua region is referred to in this project implementation plan as the MNR/Pilot Project.

C. Authorizing Mandate

The authorizing mandate for this project is Contract No. DPE 5826-C-00-5054-00 between the United States Agency for International Development and the Academy for Educational Development. A letter of Understanding between USAID/Honduras, the Ministry for Natural Resources, and the Honduras Agricultural Foundation has been developed which delineates the purpose, activities, inputs and responsibilities of all parties involved in the CTTA project. The Letter of Understanding will be signed in the near future.

II. Goals

A. Global

The transfer of technology to small farmers in developing countries such as Honduras depends in part on the flow of technological information to and from farmers; how that technological information is developed and adapted by research and extension systems; and how this information is received and utilized by the farmer. The Communication for Technology Transfer in Agriculture (CTTA) Project has been designed to apply and further develop what is known about how technology-related information flows to and from developing country farmers and how communication systems using mass media strategies and personal contact with farmers can be most effectively used in support of technology transfer to farmers.

The project purpose is to develop and demonstrate an effective communication methodology for technology transfer in agriculture. To reach the farmer population, the methodology will integrate the use of mass communications (particularly radio and graphic/print materials) and practices of social marketing with traditional channels in contact with the farmer: extension, technology development (research), training, input delivery, and marketing. It will strengthen the linkages among these channels and the farmer.

In order to develop this methodology, pilot projects will be conducted in Honduras and in at least eight additional collaborating sites. Each pilot project will involve the collaboration of a range of institutions and organizations in the agri-support system of the country hosting the pilot project. Each pilot project will require a series of interventions aimed at technology transfer over a 2-4 year period as described in greater detail below. These interventions and their evaluation will provide the basis for development of the project's communication methodology and provide the basic experience for institutionalization of the methodology developed. More specific details about the CTTA Project's goals in Honduras are presented below.

B. Honduras Project Goals

1. CTTA Project Goal

The overall or macro goal of the CTTA project in Honduras is to develop, demonstrate, and institutionalize a more effective methdology for communication support for technology development and transfer to Honduran farmers. More specifically, the CTTA project will seek both to transfer improved agricultural technology to Honduran farmers and to institutionalize an improved capability to provide the communication support essential for generating improved technologies and transferring these technologies to farmers. To achieve the project goal, the project will develop two separate, yet interrelated components: (1) a pilot project to be developed in collaboration with the Agricultural Communication Unit (ACU) of the Ministry of Natural Resources (MNR), and (2) a Communication Division (CD) within the Honduran Agricultural Research Foundation (FHIA). The pilot project,

referred to herein as MNR/Pilot Project, will be implemented in the Comayagua region and will entail collaboration with the MNR's Regional Directorate (RD). The conduct of both activities simultaneously will provide a partial basis for increased collaboration between research and extension in Honduras.

2. MNR/Pilot Project Goal

The purpose of this project component is to assist the GOH in developing and applying a more effective methodology for the use of mass communication strategies (involving the integrated use of mass media and interpersonal channels) to obtain widespread adoption of new and/or underutilized agricultural practices which will benefit the Honduran farm family. To improve the linkages among extension, research and the farmers is also a goal. An important aspect of this program is the adoption, integration, and institutionalization of systematic communications planning and design processes into the agricultural technology development and transfer system of Honduras.

3. FHIA Project Goal

While the ultimate goal of FHIA is to make the Honduran agricultural research system more responsive to the technology needs of Honduran farmers, the Foundation itself will have neither the mandate nor the resources to reach large numbers of farmers directly. Consequently, to achieve this end goal, FHIA must work through existing organizations and institutions that can be instrumental in helping FHIA to develop improved technology and disseminate information about this technology to other key actors in the agri-support system. Thus, the immediate goals of the CD are to provide the communication support necessary to meet the information needs of FHIA's multiple audiences, and to develop viable communication networks linking research, extension and the farmer.

III. Description of Approach

A. Components

The CTTA project in Honduras is composed of three components: MNR/Pilot Project, FHIA, and Linkages Between MNR/Pilot Project and FHIA.

1. MNR/Pilot Project

The concept of the CTTA project is based upon incorporating the most effective use of communication support into existing institutions and programs with minimal additional resources in a manner that will enable the host country government to sustain this activity after the project is completed. In pursuing this approach, major emphasis will be given to staff training in and application of a communication methodology for support of technology development and transfer. This approach will be developed in collaboration with the MNR/ACU which will have the primary responsibility for implementing the MNR/Pilot Project at the national level and in one pilot region (Comayagua) in collaboration with the AED.

Agricultural Communication Unit (ACU)

At the national level, the implementing agency will be the ACU of the MNR. The ACU serves, among other functions, a support role to the MNR's Extension Department. The role of the ACU for this project will be to support, reinforce, and backstop the regional unit where the pilot project is located. In later years of the project, the ACU will be expected to take the leadership role as the project is institutionalized and expanded to other regions throughout Honduras.

MNR Regional Directorate (RD)

At the regional level, the key implementing agency will be the MNR's Regional Directorate (RD) and its communication unit. The RD will have day to day responsibility for implementing the pilot project. Both the RD and the ACU will carry out the following functions: planning; investigation/evaluation; materials production; information delivery to targeted audiences; training; development and management of a two-way communication network to link together farmers, research, extension, and the agro-support sector.

MNR Extension Department

A key role of the MNR/ACU will be to involve the MNR's Extension Department and this department's regional- and local-level field staff as an integral part of the MNR/Pilot Project and as the prime channel for interpersonal contact with farmers in the pilot region. Field staff includes <u>extensionistas</u> (primarily males trained in agriculture) <u>promotores</u> (primarily females trained in home economics), and <u>auxiliares de agronomia</u> (some primary school training and experience in agriculture).

The MNR/RD Department of Extension in Comayagua (Direccion Regional

Centro Occidental) is comprised of nine local extension offices: Comayagua, Ajuterique, La Villa de San Antonio, La Paz, San Jeronimo, El Rosario, San Luis, Siguatepeque, and Taulabe. The number of extensionistas and promotores in these agencies is distributed as follows:

Agency	Extensionistas	Promotores Extensionistas	Auxiliares de Agronomia
(Valley)			
Comayagua	2	2	0
Ajuterique	4	1 (male)	0
La Villa de San Ant.	4	1	1
La Paz	3	1	0
(Highland)			
San Jeronimo	1	1	1
El Rosario	1	0	1
San Luis	2	0	0
Siguatepeque	6	2	0
Taulabe	2	0	0
Total	25	8	3

In the early stages (years 1-2) of the project in the pilot region, the regional- and local-level field staff of the Extension Department will play a key role in establishing interpersonal channels of communication between the project and the project's primary target audience (farmers in the pilot region). Later (years 2-4), regional- and local-level extension personnel from the pilot region, supported by the MNR/ACU, will play a second key role, namely, that of assisting in the diffusion of the project's communication methodology to other regions of Honduras.

2. FHIA

The Honduran Agricultural Research Foundation (FHIA) component of the CTTA Project will be implemented by FHIA's Communication Division (CD). The CD will play a key role in transferring technology generated or adapted by FHIA's Research Division to five key audiences:

1. National and international agricultural research and education institutions;
2. National and regional extension services of the MNR and other agencies of the GOH;
3. Producer, processing, trading, PVO, and other private sector organizations;
4. Foundation governing bodies, public officials, potential collaborators, and supporters of the Foundation; and
5. Potential sources of research contracts, grants, and endowments.

As previously noted, the ultimate goal of FHIA is to make the Honduran agricultural research system more responsive to the technology needs of Honduran farmers. However, the Foundation does not have the mandate and will not have the resources to reach large numbers of farmers directly. Consequently, to achieve this end goal, FHIA must work through existing organizations and institutions that, in one way or another, can be instrumental in helping the Foundation to develop improved technology and disseminate information about this technology to other key actors in the agri-support system. Thus, the immediate goal of FHIA's CD is to provide the communication support necessary to meet the information needs of the multiple audiences identified above. Linkages with farmers will be established by building, through the MNR/Pilot Project, a close working relationship between FHIA's CD and the MNR's ACU.

3. Linkages between MNR/Pilot Project and FHIA

Relationships between the MNR/Pilot Project and FHIA will be developed initially through a series of collaborative activities involving principally the MNR/ACU and the FHIA/CD. Such activities will be designed to establish functional linkages that will facilitate the two-way flow of information among research, extension, and Honduran farmers, and economize on costs.

The functional areas in which collaborative activities will be developed include: communication planning; investigation of farmer beliefs and practices related to technology use; development, pretesting, production, dissemination, and evaluation of materials in various media; coordination and management of a comprehensive agricultural communication network; and communication-related training.

B. Supporting Public- and Private-Sector Organizations

The communication methodology to be developed within the MNR/Pilot Project utilizes mass media (primarily radio) and interpersonal (primarily extension) channels as linked components of an overall communication program designed to facilitate the transfer of improved agricultural technologies to the project's primary target audience (i.e., Honduran farmers in the project's pilot region).

The project's success in applying this methodology will depend to a significant degree on the extent to which the project is able to marshall the coordinated support of a variety of public- and private-sector organizations that comprise secondary target audiences for the project. The specific organizations comprising these secondary target audiences include but are not necessarily limited to the following:

a. Regional Agricultural Committee ("Comite Agricola Regional")

The Regional Agricultural Committee (CAR in Spanish) is an organization comprised of the heads or representatives of the following regional-level, public-sector organizations:

- MNR/RD
- Instituto Nacional Agrario (INA)
- Instituto Hondureno de Mercadeo Agricola (IHMA)
- BANADESA (agricultural credit bank)
- Direccion de Fomento Cooperativo (DIFOCOOP)
- Consejo Superior de Planificacion Economica (CONSUPLANE)

The CAR in Comayagua represents a potentially significant agent for marshalling the coordination and support that will be required of agri-support organizations in Comayagua to increase the chances for the project's success as well as an important source of legitimation for the MNR/Pilot Project. The CAR membership will be identified by MNR/Pilot Project staff who, in consultation with FHIA, will develop a strategy for establishing a communication network and operational guidelines for working with the CAR for the Comayagua region.

b. Various Types of Local Groups, Organizations, and Associations

Local groups, organizations, and associations are secondary target audiences for the MNR/Pilot Project because these entities represent, for many farmers and farm families, a potentially significant source of legitimation for the project. These local organizations also represent potential sources of information essential for guiding project development and channels through which project-related information (i.e., technology) can be communicated to farmers.

This audience includes the various types of farmer groups or organizations which may be found in both the reformed and non-reformed sectors. The reformed sector refers to the country's agricultural lands which are operated by farmer cooperatives as distinct from agricultural lands in the non-reformed sector which are operated by individual farmers. Such groups include agricultural committees (comprised of independent farmers in the non-reformed sector), producer cooperatives in the reformed sector, and other farmer groups.

There are an estimated 140 producer cooperatives (grupos de base) in Comayagua that range in size between 10 to 40 farmers. The MNR/RD is currently working with an estimated 78 of these producer cooperatives (with an estimated total membership of 1390 farmers). Twenty-seven of these groups (23 in the valley and 4 in the highland) comprise the Cooperativa Agropecuario Regional Comayagua Limitada (CARCOMAL). This cooperative is affiliated with ANACH, one of the national producer cooperative federations. The balance of the groups are affiliated with one or another of the other cooperative federations (ALCHON, FECORAH, or UNC). In the non-reformed sector, the MNR/RD is currently working with 48 agricultural committees (comites agricolas) having an estimated total membership of 628 farmers. Also, in the non-reformed sector, there are at least two cooperatives: Cooperativa Fruta del Sol and COHORSIL (Cooperativa Horticola Siguatepeque Limitada). Further information about these producer cooperatives (and the cooperative federations with which they are affiliated) and the agricultural committees will be identified in greater detail during the target audience analysis and developmental investigation stages of the project's communication methodology. (In addition to the farmers reached directly or indirectly through these different types of farmer

organizations, the MNR/RD works directly with an estimated 408 independent farmers.)

Other relevant farming community groups to be identified include local organizations such as the community development committees (patronatos), women's groups, youth groups, and sports clubs. The MNR/RD's Seccion de Cooperacion Tecnica con la Mujer y Joven Rural (SECOMYJOR) is currently developing activities in seven of the nine agencies. Activities include group organization and income-generating activities such as family gardens.

c. Production Input Suppliers (Wholesale/Retail)

These suppliers (or providers) include any public- or private-sector sources from which farmers obtain production inputs such as seed/feed, fertilizers, herbicides, pesticides, fungicides, implements, machinery, or other agricultural supplies. This audience is essential in that it comprises those who are in a position to provide farmers goods and/or services essential for farmers to adopt the productivity-increasing technologies that will be disseminated by the pilot project. Production input suppliers are also important because they are in a key position to provide farmers with information about the correct use of purchased inputs required for adoption of project-recommended technologies.

In the city of Comayagua, there are 4 private sector production input stores, as follows: Agro Vet, Casa del Agricultor, Eyl Comercial, and El Sembrador. BANADESA also operates a production input retail outlet. CARCOMAL runs a production input supply operation for its members as does one of the private sector cooperatives (Cooperative del Sol). In Siguatepeque, there are 3 production input retail outlets: Agro Vet (a branch of the same store in Comayagua), Casa Valladares, and Rios Agropecuario. COHORSIL also runs a production input retail outlet for its members. At least one production input store is reported to exist in both Ajuterique and La Paz. MNR/RD extension personnel also indicate that there are sales of production inputs made by individual farmers and by "vendedores ambulantes" (travelling salesmen).

Improved seed for corn, bean, sorghum, rice, and soybean is sold to farmers directly by the MNR/RD at Comayagua.

d. Credit Suppliers

These providers include institutional as well as private sources of credit. This audience is important because of the extremely limited resource position of the primary target audience (i.e., small- to medium-sized farmers). Some of the technologies to be disseminated by the pilot project will require that farmers purchase inputs (e.g., fertilizers) in a quantity that is beyond their ability to finance from their own personal resources. Hence these farmers will need to be supported by adequate levels of credit (or agricultural production loans) if they are to be able to purchase and apply the inputs required for adoption of project-recommended technologies.

Principal sources of institutional credit (agricultural production loans) in the Comayagua region include BANADESA, the Instituto Nacional Agrario (INA), and the Centro de Desarrollo Industrial (CDI). BANADESA operates credit outlets at Comayagua and La Paz. INA provides credit for small projects (swine, poultry, vegetables, tomato, rice, and corn) and has credit outlets in Comayagua, La Paz, and Siguatepeque. CDI credit is available only through the organization's offices in Tegucigalpa.

Some agricultural credit may be available through savings and loans cooperatives, specifically the Cooperativa de Ahorro y Credito Taulabe Limitada in Taulabe and its branch office in Siguatepeque. These cooperatives are affiliated with FACACH (the national federation of credit unions).

Available credit sources for agricultural production loans, eligibility requirements, and lending terms will be identified during the target audience analysis.

e. Markets and Marketing Institutions

This category includes any public sector (e.g., IHMA) or private sector agents (e.g., middlemen) providing channels through which farmers sell their farm produce. Markets for farm produce are a key element in creating a desire on the part of farmers to change their agricultural practices in ways that enable them to capture higher returns from their agricultural resources. Uncertainty about market conditions such as demand and price for crops produced by the farmer represent a significant source of risk for farmers which can make them hesitate about adopting improved technologies. Decisions within the pilot project pertaining to the technologies that will be disseminated must take into account the market conditions and marketing capabilities for the crops that will be produced with these technologies. Information about existing markets and marketing institutions in the pilot region is therefore essential for development of the pilot project.

The Instituto Hondureno de Mercadeo Agricola (IHMA) has one "centro de acopio" (assembly center) in the city of Comayagua, where farmers can sell their bean, corn, rice, and sorghum produce. IHMA also manages several "rural centers" ("centros rurales") that were donated by the European Economic Community. Farmers can take grain to these centers for drying and storage. These centers are reported to be operational in San Jeronimo (rice), La Villa de San Antonio (rice), La Paz, and Ajuterique (corn).

Cooperatives active in produce marketing include Cooperativa Fruta del Sol in Comayagua (cucumbers) and COHORSIL in Siguatepeque (green beans and peas).

Major private sector marketers in the Comayagua region include El Pollito (rice), Bodega El Bulevar (rice), Beneficio Toledo (rice and coffee), Beneficio Salatiel Velazquez (rice and coffee), and Exportadora Andara (coffee). Other major private sector marketing

agents will be identified during the target audience analysis and developmental investigation.

f. Educational and Research Organizations

Organizations in this category represent potential sources of technological information (in the case of research organizations) and potential channels for communicating information to farm families.

In the case of the Comayagua region, this category includes primary and secondary schools. There are two teachers' colleges, one in La Paz (Guillermo Suazo Cordoba Escuela Normal Mixta) and one in Comayagua (Escuela Normal Mixta). There is a branch, in La Paz, of the Instituto Nacional de Formacion Profesional (INFOP); this institute provides training for both technicians and farmers. All of these educational institutions are reported to have some type of agricultural curricula ("actividades agropecuarias"). There is also, in Siguateqeque, a Centro Universitario Asociado Educacion a Distancia, which conducts classes on Saturdays and Sundays.

The sole organization actively engaged in agricultural research in Comayagua is the MNR/RD. It should be noted, however, that the Comayagua region is a potential target area for the research and communication programs of FHIA, and possibilities for collaboration between FHIA and the MNR/Pilot Project in Comayague will be developed during the project's implementation.

g. Religious and Civic Organizations

Organizations in this category represent potential sources of legitimacy for the pilot project and channels through which information about the project can be communicated to farm families.

Examples of religious organizations in the Comayagua region include the Roman Catholic, Protestant, Baptist, Adventist, Evangelical, Mormon, and Jehovah's Witnesses churches. Examples of civic organizations in the Comayagua region include the Club Rotario and Club de Leones in Comayagua, Siguatepeque, and La Paz. These and other religious and civic organizations in the Comayaguan region will be identified in greater detail during the target audience analysis and developmental investigation.

h. Private Voluntary Organizations (PVOs)

There are a large number of PVOs (e.g., World Neighbors) operating in Honduras. These organizations pursue a variety of agricultural, educational, health, nutrition, and other economic, social, and religious objectives. They represent potential channels through which project-related information can be communicated to farm families as well as a source of legitimacy for the pilot project. Example of such PVOs include World Vision (finances small projects in Comayagua) and World Neighbors (with 8 Hondurans and 2 Guatemalans providing soil conservation and other agricultural technical assistance in El Rosario). The Catholic relief organization, CARITAS, is also active in the Comayagua region. Another organization active in the region is

the Peace Corps, with approximately 11 PCVs distributed as follows: Comayagua (3), Flores (1), La Paz (2), San Jeronimo (2), and Siguatepeque (3). A more detailed inventory of these and other PVOs operating in the Comayagua region will be made during the target audience analysis and developmental investigation.

i. Mass Media Organizations

Potentially valuable direct communication channels for information dissemination include radio stations and newspapers. Mass media channel capability in the pilot region is essential for development and testing of the project's proposed communication methodology.

In the Comayagua region, the key mass media channels are local and regional radio stations. In the city of Comayagua, there are six AM stations, with three (*) having sufficiently strong signals to provide regional coverage, as follows: Cadena Radial Impacto (830) (*), Radio Comayagua (710) (*), Radio Corporacion (800) (*), Radio Landia (1460), Radio Sistema (920), and Radio Stereopunto (also FM). There is one radio station each in La Paz (Radio Maranata) and La Libertad (Radio Novedades), and three stations in Siguatepeque: Radio Centro Radial (950) (*), Radio Sensacion (*), and Radio Siguatepeque (1070). Other radio stations heard in the Comayagua region but whose programming originates outside the region include HRN, Radio America, Radio Comayaguela, Radio Honduras, Radio Satellite, and Radio Tegucigalpa. All are AM stations. These stations' programming schedules and estimated listenership patterns will be identified during the target audience analysis and developmental investigation.

There is one locally-produced weekly newspaper (Indice) in Comayagua but newspapers from Tegucigalpa are available at least in the larger towns. Other potential mass media channels to be identified include cinema houses, mobile sound units, and locations where the public (farm families) can be reached in a group context (e.g., the mayor's office in Comayagua is reported to maintain a calendar of the fairs held in the Comayagua region).

A weekly agricultural newspaper, El Agricultor, is now being published in Honduras. This medium provides a potentially powerful channel for supporting the project's communication intervention. This potential will be explored in greater depth during the target audience analysis and developmental investigation (e.g., points where this newspaper is sold in the Comayagua region, potential for publication of project-related messages at appropriate times during the agricultural season and the communication campaign, etc.).

Ongoing agriculture-related programming in these mass media channels will be identified during the target audience and developmental investigation. For example, the MNR/RD sponsors a daily (Monday through Friday from 5:00-5:30 pm) radio program, El Informador Agropecuario, on Radio Comayagua. This program is prepared by Alba Ninfa de Velazquez of the MRN/RD.

j. Other Channels for Farmer Contact

Other potential channels include all existing communication systems or networks currently employed in support of other development-related initiatives in agriculture, education, family planning, health, or nutrition. For example, there is a Japanese-funded Centro de Entrenamiento y Desarrollo Agricola (CEDA) which has recently started in the Comayagua valley. This center will provide technical training and support for irrigation development in the valley. Some of the center's programs will be developed in collaboration with water users' groups in three of the valley's irrigation districts: Selguapa (in the MNR/RD Ajuterique agency) and Flores and San Sebastian (in the MNR/RD La Villa de San Antonio).

The potential for tapping into the communication methodologies and systems (networks) of such projects will be explored during the target audience analysis and developmental investigation stage. An important secondary data source to be investigated during this stage is the regional characterization ("caracterizacion regional") survey data collected earlier in 1985 by the MNR/RD extensionistas in a regional survey conducted by MNR's Resource Sectoral Planning (Planificacion Sectoral de Recursos) unit. This study is being funded by USAID/Honduras and coordinated by Ing. Marta Galeas. The survey data, from approximately 1300 farmer interviews, is being tabulated by Ing. Isidro Castro. It is expected that the tabulated data and some of the data analysis will be ready by December of 1985.

C. Overview of Strategy

A multi-media communication strategy based on target audience analysis and developmental investigation will be designed and implemented in the pilot region to support extension and associated programs in the transfer of appropriate agricultural technolgies to the farmer. This strategy will include present extension methodologies integrated into a comprehensive communication support program which also utilizes mass media, particularly radio and graphic/print materials. The objective will be to use the various media as mutually reinforcing sources of information to farmers and to apply behavioral analysis and social marketing techniques to increase total program impact and the number of farmers reached effectively. The fourteen-point methodology which will be used in planning and implementing this activity is further developed and described later in this project implementation plan. In summary, they are:

1. Identification of New Technologies
2. Target Audience Analysis and Developmental Investigation
3. Planning and Strategy Development
4. Product or Concept Testing
5. Materials Development and Testing
6. Program Implementation and Ongoing Monitoring
7. Formative Evaluation
8. Review, Replanning, and Adjustment
9. Management
10. Interinstitutional Coordination
11. Networking
12. In-service Training
13. Training Field Trials

14. Institutionalization

A summative evaluation will be conducted by ACT as part of the overall contract services to assess the impact of the methodology developed under the project on technology transfer. This evaluation will focus primarily on the relationship between the technology transfer interventions and farmer knowledge, behavior and practice.

IV. MNR/Pilot Project

A. Objectives

The MNR/Pilot Project will contribute to the overall agricultural objectives of Honduras by:

1. Developing and demonstrating a more effective communication methodology for supporting agricultural technology transfer programs which integrate the use of mass media (particularly radio and graphic/print materials) with traditional channels of farmer contact (extension), and link technology development (research), input delivery, training and marketing with extension and the farmers;

2. Institutionalizing this communication methodology into the agricultural technology transfer system of Honduras; and

3. Diffusing the methodology nationally and internationally.

The objectives of the pilot project include:

1. Promoting the adoption of new and/or underutilized agricultural practices among farm families by developing a mass communication methodology to support technology transfer;

2. Verifying the impact of the communication methodology on the transfer of technology in agriculture through evaluation;

3. Strengthening the networking methods and procedures to improve linkages among research, extension, other providers (both public and private), marketing institutions, and the farmer;

4. Institutionalizing the communication methodology developed through the pilot project within the MNR with the purpose of developing the capability of the MNR/ACU to provide leadership in expanding and utilizing the methodology in other regions; and

5. Disseminating the findings of the project to the professional community, nationally and internationally.

B. End of Project Status

Some of the benefits to be realized by the MNR/Pilot Project will be direct and will occur during the life of the project; others will be indirect and will occur in the years following the project's completion. These direct and indirect benefits can be expected in several broad categories.

1. Generation of Knowledge about:

- Agricultural technologies which are appropriate to the project's target audience (Honduran farmers).
- The role and effective use of communication to support technology development and transfer in agriculture.
- The process of institutionalization of program assistance and other investments for agricultural technology development and transfer.

2. Development of a Process and Methods for:

- Integrating the capacities of several disciplines including agricultural extension, development communications, behavioral psychology, and social marketing for effective application in agricultural technology transfer.
- Integrating the project's communication methodology into Honduras' agri-support system, including research, extension, production input supply, and agricultural marketing.
- Adapting and transferring the project's communication methodology to other regions of Honduras and other developing countries.
- Evaluating the benefits and results of applying the communication methodology.

3. Practice Changes and Direct Benefits including:

- Improvement in agricultural production performance through adoption of productivity-increasing inputs and behaviors (practices) by farmers and farm families in the pilot region.
- Tested materials and message delivery procedures adapted to the Honduran technology development and transfer system.
- Pilot region and national level communication units which are adequately equipped and staff who are competent in applying the project's communication methodology.

4. Networks and Participation including:

- Established linkages between project activities and national and international centers of agricultural research and

extension.

- Infusion and diffusion of the project's communication methodology in the training curricula of Honduran agricultural research, extension, training, and educational programs.

- Understanding of the methodology and impact of the pilot project among all donors and technical assistance agencies providing development support to Honduras.

5. Institutionalization and Expansion including:

- In-service training and institutionalization of the project's communication methodology in the pilot region.

- Organizational changes in the collaborating institutions in the pilot region.

- Development of the organizational ties necessary to diffuse the project's communication methodology to other agricultural regions of Honduras and other developing countries.

- Introduction, through training and seminars, of the project's communication methodology in other agricultural regions of Honduras and other developing countries.

- Modification of the accepted norms for conducting agricultural extension in Honduras.

6. Tangible Product Documentation including:

- Summative evaluation of the pilot project.

- A manual (in Spanish) that outlines the project's communication methodology and illustrates its application in the Honduran context.

- A series of printed materials and videotapes (in Spanish) which can be used to support training in the project's communication methodology and in disseminating information about this methodology throughout Latin America and, through the English and French equivalents of these media, to other developing countries.

- Books, reports, articles, and field notes on all aspects of the project, usable by a wide spectrum of interested people from researchers to project implementors and development practitioners.

- Working models of materials, plan, investigation instruments, evaluation tools, etc. developed during the pilot project which can be used and adapted as appropriate to support transfer of the project's communication methodology to other agricultural regions in Honduras and throughout the developing world.

C. Inputs

The inputs to the MNR/Pilot Project will be provided by AID through the AED and by the MNR. The inputs to be provided by each party are as follows:

1. AID will support the MNR/Pilot Project by providing the following through the AED: Two full-time resident staff--a Communication Advisor for 48 person-months and an Evaluation Specialist for 48 person-months; short-term technical advisors up to 10 person-months over the life of the project in areas such as communication, social marketing, behavioral science, evaluation, and agricultural technology, with the specific disciplines and timing to be determined during the project's implementation; operating expenses for special pilot project activities during the life of the project; basic communication-related equipment for the Ministry's Agricultural Communication Unit (ACU) at Tegucigalpa and the Ministry's Regional Directorate (RD) at Comayagua; and two (2) vehicles for the long-term advisors, said vehicles to be turned over to the MNR at the end of the project.

2. The MNR will support the MNR/Pilot Project by providing the following: national counterparts, office space, including utilities, furniture, office equipment and telephone lines for the project advisors and the counterpart personnel and adequate space for facilities and equipment supporting the project at the MNR/ACU and MNR/RD levels; resources and other personnel (professional, secretarial, administrative) as required to implement this project, and release of MNR personnel as necessary to participate in project-related activities; consignment of communication equipment currently in the Ministry and MNR regions to the national-level MNR/ACU and the MNR/RD at the pilot project site; access to MNR print and audiovisual facilities as necessary; and air time as required to meet the regular broadcast schedule, based upon the results of the target audience analysis and developmental investigation and designed to reach the target population on those days, at those hours of the day, and on those radio stations which will ensure maximum reception.

D. Selection of Pilot Project Site

Two locations were considered as potential pilot project sites: Danli and Comayagua, and examined with respect to a predetermined set of criteria. The criteria, analysis, and conclusion from the site selection process are described below.

1. Criteria

Five criteria for the selection of the pilot project location are:

a. An AID and Host Country Government agricultural program which could benefit from participation in the project;

b. Clearly identified technology--new or underutilized--which imply a significant role for change in farmer practices in increasing productivity;

c. An agricultural research base that can provide a continued flow of new and adapted technology;

d. Commitment from the host country government to further develop its communications activities for technology development and transfer; and

e. A pilot site with available, appropriate technologies and institutions, personnel, communications infrastructure, and research linkages capable of sustaining project activities.

2. Analysis

a. Benefits to AID and host county government agricultural programs:

Both sites were considered to have the potential for contributing to the agricultural programs.

b. Presence of appropriate, clearly identified technology--new or underutilized; sample technologies available at each site include:

Danli -- Potential technologies include: bean slug control, high lysine corn (nutridia maiz), improved varieties of corn, small scale irrigation, minimum contour plowing, family gardens, varieties of red beans, potatoes, sorghum wheat, etc.

Comayagua -- Potential technologies include: bean slug control, appropriate farming equipment, improved mold board plow (arado), disk harrow (rastra) (surcadora), fish farming (piscicultura), water use, corn varieties, handpumps, windmills, vegetable diseases, new plant introduction, soy beans, strawberries, snowpeas.

Available appropriate technologies are sufficient for CTTA project purposes in both regions.

c. Sufficient agricultural research base to support the project:

Danli -- Pan American Agricultural School (Zamorano)

Comayagua -- Development and Adaptation Unit (a project to develop machinery appropriate for small farmers and cooperatives. Examples of machinery developed include pumps, wood gasification, engines, plows, tillers, harrows, and bellows.

Both of the potential sites have access to research efforts in their respective regions. FHIA is geographically more accessible to Comayagua than Danli, and has already initiated discussions in Comayagua about expanded relationships. Zamarano has a broader perspective as a regional center for agricultural research and education.

d. Commitment from host country government:

The MNR is committed to a policy of developing its communication activities for technology development and transfer regardless of the region selected.

At the regional level, a substantial investment has been made in Danli over the past 2 years. The staff are motivated and comprehend the concept of the program. The communications staff person has been formally trained in communications. The office leadership of both sites is committed to having the project at their location. In Comayagua, the staff were interested in the project, but there was less understanding of the project's concepts due to little previous staff exposure. It is estimated that it would take some time to bring the staff up to the same level as in Danli. (It should be noted that the personnel in one or both regions may change after the forthcoming national elections in November.)

e. Pilot site with appropriate resources:

Danli -- This office currently has computer equipment (Wang) being used for tracking credit and administration. There are 5 transmitters in Danli and 3 in El Paraiso. Two radio stations (Danli and Oriental) are very good. A separate facility on the premises has been set aside for the communication unit and pilot project. The MNR regional office has just begun a series of radio programs and spots with broad-based objectives linking mass media and extension activities with the farm family needs.

Comayagua -- This office will be acquiring computer equipment for the activities of the investigation unit in the near future. It is anticipated that an IBM PC/AT and a regular PC will be procured. There are 5 transmitters in Comayagua and 2 in Siguatepeque.

3. Conclusion

Both locations would be viable for the CTTA pilot project site based on an initial analysis. Danli was selected on a provisional basis. However, based on additional indepth discussions, several major questions were raised about locating the project in Danli. Of those, the most critical were related to the present eight-year, EEC-funded fourteen million dollar integrated rural development project in Danli.

This project has a mass media component. The communication staff are working full time on this project. The EEC project currently operates in five of the twelve local extension offices and will expand to the remaining seven offices this next year. Given the scale of this project, it would be exceptionally difficult to differentiate between results of the EEC and CTTA projects. Staff loads would become excessive if the two projects were to function in the same region, and compromises between the EEC project and CTTA would be required to accommodate their different methodologies.

Appendix I contains a description of the Comayagua region, the possible technologies and the communication infrastructure.

E. Methodology

The pilot project will develop an effective methodology for using communication to support technology transfer in agriculture. This methodology will integrate the use of mass communications and practices of social marketing with traditional channels of contact with the farmer: extension, research, training, input supply, and marketing. It will strengthen the linkages between and among these channels and the farmer, with the objective of increasing the opportunity for farmers to learn about and properly use improved agricultural technologies.

The process involved in developing the project's methodology for utilizing communication to support technology transfer in agriculture entails 14 distinct, yet interrelated components. These components define a set of procedures that provide for systematic development and implementation of communication strategies that increase the capability of technology development and transfer systems to respond to the technology needs of developing country farmers. Assignment of responsibility for actions related to each of the components will be included in the integrated action plan to be prepared during the first six months of the project's implementation. Each of the 14 components of the project's communication methodology is now briefly described. Table 1 places these components into a time-phased implementation plan.

1. Identification of Improved Technologies

During this initial step in the project's communication methodology, agricultural specialists will identify those technologies which, relative to current farmer practice, are either new, improved, or underutilized by the farmer. This step will be implemented, in part, by a review of available information and experience on proven or potentially improved technologies for a chosen target audience. The choice of technology to be transferred to farmers will also be based on the development and review of certain types of non-agricultural data essential for determining the potential acceptability of a particular agricultural technology to its potential adopters.

Project staff will develop an integrated set of procedures geared to providing the information required for a sound choice as regards the technology that will be transferred to selected target audiences. These procedures include target audience analysis, behavioral analysis, developmental investigation, and product or concept testing. Although these procedures are described sequentially below, they imply certain types of data collection and analysis which will need to be developed almost simultaneously to identify appropriate improved but underutilized agricultural technologies.

2. Target Audience Analysis and Developmental Investigation

The objective of developmental investigation is to bring the data generated by the audience and behavioral analyses to bear on the question of determining how information about an improved technology

should be packaged in order to make the technology acceptable to farmers and to motivate desired learning and behavioral change on the part of farmers in the segmented target audiences. Critical questions to be answered are:

1. What benefits will the farmer experience, and when?

2. Will the farmer relate the new technology to the resulting benefits?

3. Will the farmer perceive the cost (time, money, risk, etc.) as being too high?

4. How can the relative costs and benefits be described most persuasively to the farmer?

5. What costs in relation to benefits will the farmer be willing to pay for giving up what he is already doing?

The answers to these questions are essential for determining an appropriate communication strategy, that is, a strategy that will be effective in making the technology acceptable to farmers and motivating the learning and behavioral change required for adoption of the technology by farmers and incorporaton of the technology into the farmer's farming system.

In short, the developmental investigation assists in decision making that pertains to (1) specific technologies that are appropriate for and acceptable to specific audience segments and (2) how messages about these technologies should be packaged so as to facilitate farmer adoption of the technologies.

A plan for coordinating the developmental investigation with other procedures (e.g., target audience analysis and behavioral analysis) will be prepared and implemented during the first few months of the project. The results of this stage will serve as the foundation for developing the integrated action plan.

Target audience analysis consists of a series of routine steps which will take place over the life of the project based on each technology to be promoted. Target audience analysis will be institutionalized as part of the overall methodology. Relevant data to be collected and analyzed for understanding the audience analysis includes:

1. Geographic, demographic, cultural, economic, social, and communication characteristics of the target population;

2. Profiles -- knowledge, attitudes, and behavioral attributes of the population, including:

- Lifestyle and personality (e.g., degree of willingness to take risk);
- Benefits sought from agricultural technology and readiness to adopt; and

- Location on the usage continuum (unaware, aware, knowledgeable, interested, ready-to-try, using, or once used).

3. Communication environment and media use patterns (e.g. use of radio).

Pilot project staff will obtain data on these characteristics from secondary sources, key informant interviews, focus group interviews, in-depth interviews, observations through farm visits, central location (intercept) interviews, and other small sample surveys. The data will, in conjunction with behavioral analysis and developmental investigation (described below), be used to segment the pilot region population into specific target audiences and potential improved technologies for these audiences.

Behavioral analysis will entail application of a specific methodology to evaluate the required behavioral components (practices) of potential improved technologies in terms of specific behavioral criteria (e.g., complexity of a new technology's required farmer behavior as compared with the complexity of the farmer's current practice). The goal of the behavioral analysis is to better understand the behavioral requirements of the new technology and to identify how farmer adoption of the technology's required behavior could best be achieved. Conducting behavioral analysis will entail visits with farmers, which can most productively be accomplished by working directly with the researchers, extensionists, and farmers participating in the MNR's "enlace tecnologico" program. The "enlace tecnologico" concept, in practice, brings researchers, extension workers, and farmers together, at the farm level, to work on problem identification, solution development, testing, modification, and demonstration of technlogies which have been validated as improved.

The specific approach to be used in conducting a behavioral analysis will vary from one practice to another. Some analyses may require a phased observation approach, coinciding with seasonal changes in how a new practice is applied (e.g., split applications of fertilizers); others may be more discrete and limited in time, requiring only a few hours on selected farms to gain insight into the farmer's ability to use the required practice (e.g., application of a control measure for a pest such as the bean slug babosa). In conducting the behavioral analysis, emphasis will be placed not only on identifying the farmer's potential ability to engage in the behaviors required by a new technology, but also on identifying the approach that will be most effective in providing the farmer the opportunity and incentive to learn the new behaviors and incorporate them into his or her farming system. This emphasis is more fully addressed in the developmental investigation.

3. Planning and Strategy Development

Based on the results of developmental investigation, project staff will (1) develop clear, measurable objectives for behavioral change in farmer knowledge, attitudes, and behavior (and also objectives for

behavioral change in the secondary target audience or agri-support system); (2) segment the pilot region population into specific target audiences (e.g., corn farmers with access to credit and corn farmers not having access to credit); and (3) specify the mix of communication and marketing elements that will be used to reach the selected target audience segments. It is at this stage that an integrated action plan will be prepared, the support of relevant authorities and the agri-support system will be developed, and budget and resources will be allocated.

The key to this component of the overall methodology is the strategic integration of extension methodologies, communication and social marketing concepts into an overall action program. This program will have four key elements:

1. The product or offering (i.e., the information to be transferred) and how it will be positioned and packaged.

2. The distribution channels for disseminating the product to target audiences.

3. The price (monetary, psychic, energy, and time costs) which the farmer must pay to acquire the product (technology).

4. The promotion or communication effort that will be mounted to support the transfer of the technology to potential farmer adopters in the target audience(s).

An integrated action plan, based on the results of stages 1 and 2, will be developed which includes behavioral objectives, pilot region target audience segments, the specific mix of marketing elements to be used, the key actors who are to be involved in support of the project's intervention, and a timetable for achieving the coordinated involvement of all designated parties.

The specific communication component of this plan will delineate a timetable for development of message content, selection of media to be used (primarily radio, interpersonal, and graphic/print), and institutionalization of an educational programming system. Complete technical details regarding these and related communication elements which need to be addressed will be developed in the integrated action plan.

4. Product or Concept Testing

Based on the research and planning conducted in stages 1 to 3, a product (or concept) will be developed for testing with target audiences. The product concept is the transformation of the information from agricultural research (e.g., data on a particular technology) into a simple set of messages for transferring the technology to the target audience. The shape of the product is contingent on the market research information generated during the target audience analysis and development (stage 2). Consideration of perceived risk and other behavioral criteria will guide the development of the project. The product, in the form of

experimental messages, will be tested in the field to determine how farmers react to the product and how this product (the message or information about the technology) should be adapted to increase the likelihood of motivating desired learning and behavioral change on the part of the farmer. Product testing will go beyond simply determining product acceptability and attractiveness; it will also consider whether the farmer is able to use the product correctly and whether the product is feasible given the current performance capability of the agri-support system.

It is important to note that the product or concept testing stage will be applied not only to the specific technology that is to be transferred but also to evaluation of new communication channels and their potential for supporting a communication intervention. The product or concept testing stage will be closely related to the behavioral analysis and developmental investigation components of the target audience analysis and developmental investigation stage.

5. Materials Development and Testing

This stage entails the production of the materials that will be used in the selected media channels. The materials will be developed based on results of the project's target audience analysis and developmental investigation (stage 2), planning and strategy development (stage 3), and product or concept testing (stage 4). The broadcast and/or print materials to be used will be produced in rough or prefinished form and then pretested with farmers typical of the target audience to be reached.

Project staff members, extension agents, intermediary organization channels, and other key actors in the agri-support system will receive in-service training as a key part of the materials development and testing stage. Training materials to be used in this process will be developed, pretested, and refined before any full-scale use. Interinstitutional coordination is an important element of this training or orientation process. Meetings and seminars will be held for all potential participants in the project's supporting communication network. Such meetings and seminars are essential for legitimizing the project in the pilot region and for ensuring that all who need to know about the project are fully briefed on the project's objectives, target audience, areas of action, organization, methodologies, anticipated results, and the key roles which each and all must play if the project is to achieve its objectives.

6. Program Implementation and Ongoing Monitoring

The communication support program will be launched by implementing the action steps specified in the integrated action plan, monitoring the program's impact through systematic feedback and feedforward mechanisms, and monitoring the institutional performance of relevant secondary audiences in the agri-support system. Key action steps at this stage will include distribution of media materials to dissemination points and verification that they are used as programmed, continued implementation and monitoring of the plan's educational programming system, and liaison with relevant secondary

audiences in the agri-support system. As part of the educational programming system, there will be continuing monitoring to ensure maintenance of communication output quality. Procedures for verfying that all communication activities are operating as planned, that paid or unpaid advertising has been placed on radio or in print, that adequate publicity is being generated, and that print materials are being properly distributed will be developed and implemented. In short, as implementation proceeds, the project staff will monitor the the activities of "the marketplace".

Use of the media materials as and when scheduled will be another necessary function of the project's staff. Radio stations will be monitored to determine if the spots, programs, etc. are being aired at the agreed-upon times. The use of materials by extension agents and other institutions and firms participating in dissemination will be verified through periodic, unannounced spot checks. Feedback from the field will provide a continuing check on whether or not the materials are used as planned, as well as on the effectiveness of their use.

• Ongoing Program Monitoring -- It can never be assumed that the program is functioning as planned. Ongoing monitoring of the project's performance is needed to ensure that the program is operating effectively and as planned. Feedforward/feedback and formative evaluaton (discussed below) will provide the information from the field to identify needs for mid-course corrections in the communication program. Formats will be developed for use by project managers and supervisors in monitoring performance related to training, message content development, and design, testing, production, distribution, and dissemination of media materials against what is programmed in the implementation plan. The project staff will be responsible for developing the formats to be used, analyzing the results reported, and taking appropriate action to correct identified deficiencies or problems.

• Educational Programming -- The multiple functions of the educational programming system will be directed toward: the development of educational messages that are localized, practical and directed toward the interests, problems and potential opportunities of people in the rural areas who constitute the project's target audience(s); delivery of those messages in the proper sequence at the right time through appropriate media; and regular and systematic collection of comprehensive information from the people which is fed back into the system quickly to improve the program's quality and acceptabilty.

7. Formative Evaluation

Studies will be designed and conducted to determine whether the messages disseminated by the project to farmers have been received by them in a timely manner, whether the technologies included in the project's communication messages are perceived by farmers as useful and practical, whether those messages have been understood (or why not), the extent to which farm women react to and have been helped by the communication intervention, and whether the various elements of the intervention are functioning as planned.

In the context of the CTTA methodology, formative evaluation differs from the earlier target audience analysis and development investigation in that such evaluation monitors the project in progress. However, methodologies and techniques used in the target audience analysis and developmental investigation stage will also be used during the formative evaluation stage. Information obtained through formative evaluation will be correlated with the information generated by the target audience analysis and developmental investigation.

Formative evaluation will be an important source of feedforward/feedback information. Thus, formative evaluation will require quantifiable data susceptible to analysis. Both formative evaluation and feedforward/feedback will provide sources of information that will be used throughout the course of the project to make midcourse adjustments and improve project performance. Although the evaluation specialist may assist in formulating evaluation efforts, formative evaluation will be the primary responsibility of all the pilot project staff.

8. Review, Replanning, and Adjustment

The entire process of the project's communication methodology is iterative, with information and experience gained at one stage either feeding back into earlier stages or feeding forward into the planning and, as necessary, redesign and implementation of later stages. Although the initial target audience analysis and developmental investigation will provide a major input to the development of the project's communication intervention, elements of the target audience analysis and developmental investigation will be repeated or pursued in greater depth, in addition to formative evaluation, during the course of the project's development. In short, the project's success will depend on continuous monitoring of program impact and modification, as appropriate, of project interventions.

The project staff will conduct a series of project meetings, at regular intervals, that will review project status, replan, and make program adjustments in the project's implementation for the upcoming months. These meetings will provide a forum for critical review and discussion of the most current information from target audience analysis and developmental investigation, product testing, feedback/feedfoward, and formative evaluation. These meetings will provide the analytical and design base for monitoring the project's communication intervention and reprogramming this intervention as appropriate to keep it on target relative to the project's objectives.

At the end of each year, the project's implementation plan and the adjustments made in implementing the project during the year will be reviewed in detail. Information collected during the year through the various activities mentioned above will be reviewed to assess the appropriateness of adjustments made, to measure progress, and to determine those project areas that still require adjustments or revision to enhance the effectiveness of the communication intervention. Results from the summative evaluation also will be taken into consideration as they become available. The implementation

plan will then be updated and replanned for the next project year.

9. Management

Management guidelines and practices will be developed and maintained to ensure that all functions will be executed in an appropriate sequence. It is recognized that several functions will proceed concurrently, that the communication interventions to be developed during the project will be highly time-specific and that the project will adhere to an agreed upon feasible, but tight, schedule.

The project will be executed through existing institutions and personnel in the pilot region. A key role of the project staff will be to ensure that researchers, extension workers, input suppliers, marketers, and farmers in the pilot region collaborate in the various stages of implementation of the project's communication methodology and that appropriate resources from the MNR at the central level are made available to support the project.

Responsibilities of the MNR, the AED, and USAID related to the pilot project are defined within the Letter of Understanding negotiated between these parties.

10. Interinstitutional Coordination and Collaboration

Effective coordination and collaboration with an array of agri-support institutions and organizations will be essential to project success. Some of the public and private sector organizations that potentially could collaborate in the project are identified in an earlier section.

Various mechanisms will be considered to achieve the needed coordination and collaboration, such as:

- Establishment of an ongoing interinstitutional coordination committee.
- Establishment of an ongoing interinstitutional group to participate in message content development and coordination.
- Use of ad hoc multidisciplinary groups at various stages of the program development process, particularly those related to developmental investigation, behavioral analysis, audience analysis, product testing, and formative evaluation.
- Seminars and workshops, including an annual project workshop.
- Development and implementation of a viable communication network.
- Exchange of reports and other documents with other institutions (both national and international).
- Continuing interpersonal contact with representatives of institutions with which the project will coordinate and/or collaborate.

Interinstitutional coordination and collaboration will be essential not only for the development of the project's communication methodology but also its institutionalization within the Honduran technology development and transfer system as an ongoing process after the project's completion. Effective interinstitutional coordination and collaboration will require a concentrated effort by project personnel to inform the relevant institutions about the project, to help them understand the relevance of the project's communication methodology and strategy to them and their programs and how coordination and/or collaboration with the project can work to their own as well as the project's benefit, and to build support for such coordination/collaboration at both the administration/management and working levels. To achieve the required coordination and collaboration, project personnel will systematically inform relevant institutions on key aspects of the project's implementation, and involve them in useful, functional roles in implementing the project.

Intrainstitutional coordination and collaboration will also be required for the project's success. For example, development of working relations and coordination with extension workers at each level will be particularly critical since they will play a major role in developing and implementing the project's communication strategy. The approach used in achieving intrainstitutional coordination and collaboration will include the types of mechanisms used for interinstitutional coordination, plus in-service training (described further below).

11. **Networking**

The basis for development of networking procedures will be the various activities and coordination mechanisms specified in the project's communication methodology. Key institutions (e.g., FHIA) and individuals to be included in the network are identified elsewhere in this implementation plan and will be expanded during the project's implementation.

Leaders of other agricultural projects in the country, the USAID Project Monitor, and the Cognizant Technical Officer (CTO) will be included in the communication network with the objective of keeping them fully informed at all times on the project's progress and activities and developing situations in the pilot region. Networking will extend beyond the boundaries of Honduras to include regional and international agricultural research centers and programs, and individuals in other sectors with which the project could productively collaborate.

Two major factors will be taken into consideration in networking: the information to be disseminated and the mechanisms through which such dissemination is effected. Not all members of a network will need all information generated by the project, and the project will not require all information produced by all members of the network. The types and extent of information flow to, from, and among the network members will be determined through interaction with the institutions, organizations, and individuals concerned.

The channels through which the information will flow will depend in part upon available facilities and, in part, by the urgency of need for the information. The project staff will analyze the information needs of network members as they relate to the project and will establish appropriate channels for information exchange.

The networking procedures described above represent a methodology for the systematic exchange of information to ensure an uninterrupted and comprehensive flow of information to users who have a "need to know." They supplement, rather than replace, the specific channels described for other project components.

12. In-service Training

In-service training will entail training of a cadre of counterpart professionals; and training within the project of communication staff, extension workers, and others required for successful implementation of the communication methodology.

During the early stages of project implementation, it will be important for the project to receive the support of high level officials. Orientation meetings for senior officials of Honduran public and private sector organizations will be held. These meetings will focus on the project goals, objectives, methodology, and benefits for Honduras, and the role of the pilot project as an integral part of an international research and development effort to strengthen the capability of communication to support the development of improved agricultural technologies and their transfer to developing country farmers.

• Cadre of Counterpart Professionals -- A cadre of at least 5 MNR/ACU and MNR/RD staff will receive in-service training in support of institutionalizing the project's methodology. The cadre to be trained will include those individuals comprising the project management team.

The major training approach to be used with this group will be on-the-job experience, working with the RAs and short-term technical assistance. This will be supplemented with assigned reading materials, counseling with technical assistance advisors and other specialists available in Honduras, participation in national and international events organized as part of the project's diffusion activities, and participation in appropriate professional and training events.

• Training for Project Implementation -- The project will, to the maximum extent possible, utilize existing manpower skills in agricultural training; investigation and evaluation, radio broadcasting, print production, graphic arts, audiovisual production, and other skills required for the communication program. However, specific in-service training in some of these skills will be provided for project personnel as required to meet program needs. This training will be provided by the RAs or short-term consultants, and will be supplemented by short courses using local expertise, short apprenticeships or on-the-job training opportunities with institutions

or firms that have the relevant skills and capabilities, and reference manuals related to the particular skills required.

Another training need equally critical to the success of the project will be training of extension and other technology diffusion personnel in communication skills and the agricultural technologies to be incorporated into the project's communication intervention. They must understand not only the technical content of the information to be provided to farmers, but also how various interpersonal channels and teaching aids can be used to increase teaching efficacy and how they can relate their work to other media through which the same technical messages are being disseminated.

Principles from behavioral science will be adapted and applied in organizing and conducting training events for extension and other diffusion workers. Specific training objectives will be defined in light of the currently existing behavioral patterns and the new behavioral patterns which need to be instilled. The teaching methodology will be guided by the following behavioral science principles:

- Give the trainees reasons to care about what they are about to learn.
- Break the task (or agricultural technology) into its component parts.
- Provide a model to be observed and imitated.
- Use positive reinforcement and help trainees to avoid errors.
- Use uniform words, phrases, and fomulations throughout.
- Make the learning situation as realistic as possible.
- Gradually eliminate prompts until the entire performance is carried out by the trainee unaided.
- Continue training to the point that the trainee is able to execute the procedures or impart information accurately and with confidence when he/she returns to his/her own setting.

Communication skills and technical knowledge learned in initial training sessions will be reinforced by technical backstopping and positive supervision. Initial training also will be reinforced and updated through regularly scheduled follow-up in-service training courses and events. Involvement of the extension worker with the researchers in conducting on-farm trials will be an important component of training related to the agricultural technologies to be recommended.

13. Training Field Trials

New teaching concepts and materials will be introduced into training of project staff, extension workers, farmers, women, and youth in the

pilot region. These new concepts or materials will need to be tested in use and this will be accomplished through "training field trials" in which an experienced observer team will observe training sessions in progress to determine what actually happens, the interaction between the trainer and the participants, and reactions of the participants to the teaching methodology and materials to be used. Training field trials are an important step in instructional design. In effect, they provide a sort of product test of training concepts, procedures, and materials.

14. **Institutionalization**

Institutionalization of the methods and procedures developed by the project will be a major objective of the project. The MNR with the assistance of AED will work toward this end in developing all project activities. Those activities most crucial to the institutionalization process include:

- Establishment of the internal program management structure and in-service training of staff in project management positions.
- The educational programming system and other elements of planning and strategy development.
- Staff training.
- Modification of roles of extension workers to accomodate the new techniques and methodologies, particularly in relation to the application of behavioral science, social marketing, and communication concepts and methodologies in the agricultural context.
- Networking.
- Providing information about the methodology and results being obtained to key Honduran policy decision-makers to gain and maintain active support for and understanding of the methodology being developed by the project.

It is anticipated that by the end of the project the Honduran project staff will be sufficiently competent in the project's communication methodology that they will be able to continue using it effectively in the country's ongoing technology development and transfer programs, and that the primary implementing agency (MNR/ACU) will have institutionalized the process, making organizational and staffing changes as needed, to the extent that it is reflected in policy and/or management decisions, plans for future-year activities (including expansion of the communication program into other agricultural areas of the country), and budgetary allocations reflecting an ongoing accommodation of the methodology within the MNR.

F. Evaluation (Summative)

1. Introduction

The summative evaluation plan will focus directly on the outcomes that will result from the promotion of specific technologies. The development of a detailed plan requires information about the technologies, the distribution of farmer characteristics, the communication strategies used in promoting change, and other project details which are not yet defined. Hence this section presents some general considerations and approaches that will be useful in most of the likely outcomes.

The planning of the specifics of the Honduran evaluation activity draws from the experience of conducting a large scale evaluation in Honduras from 1981 to 1984. That evaluation was of the PROCOMSI intervention, under AID'S Mass Media and Health Practices project, which utilized a related approach to introduce new health behaviors related to infant diarrhea. The lessons gained from that evaluation experience have guided the development of the plan presented here.

As in the previous effort summative evaluation.is regarded as a distinctive and separate activity. It is not intended that the summative evaluation efforts will be institutionalized as a part of the projects goals. The responsibility for formative evaluation rests with the project implementation staff. Summative evaluation is the responsibility of the Evaluation Field Director but it is expected that there will be a high degree of informal cooperation among them.

The previous evaluation used an approach of tracking a panel of mothers over time and measuring changes in their behaviors. The data collection took place in the Departments of Francisco Morazon and El Paraiso from a panel of 750 families. The mothers' behaviors and the children's growth were measured repeatedly. The development of this particular approach to measurement was based on the specific characteristics of the "technologies" being introduced and the way in which the behaviors were expected to be distributed in the population and over time.

The behaviors related to agricultural change have very different characteristics and hence necessitate a different approach to planning a sampling and measurement strategy.

The general approach proposed here is the establishment of a very large panel of potential respondents at the beginning of the evaluation, from which working samples will be drawn during the course of the project. The large sample would be measured periodically, but most of the research would be in focused studies that include only those farmers with characteristics appropriate to the particular technology. This strategy is driven by the probable diversity of the technological practices to be promoted during the intervention.

2. Evaluation Office and Staff

The main office for the evaluation will be located in the Ministry of

Natural Resources in Tegucigalpa. It will be headed by a full time Evaluation Field Director, who will be supervised by the project staff at Applied Communicaton Technology. The Evaluation Field Director will work in cooperation with a counterpart from the staff of the Central Communications Unit. Reporting to the Evaluaton Field Director will be a team of locally recruited field workers plus support staff. The field workers will probably be located in the project offices in Comayagua, from which they will travel to carry out the required data collection tasks.

The field workers' tasks will include conducting interviews for the periodic major surveys and conducting intermittent special studies. The same field workers will be responsible for coding and checking of each others' data, with data entry onto the project's microcomputer for initial statistical analysis accomplished by an additional person. For planning purposes, it is assumed that a permanent field data collection staff of three researchers will be augmented by additional short-term staff when larger surveys are conducted, and that the remainder of the time, the field workers will be kept fully occupied by focused studies. The evaluation field office will open concurrently with the implementation field office and remain open through four years of intervention.

3. Target Audience and Sampling Plan

The terrain and climate in Honduras are quite diverse and cause a parallel diversity in farming patterns. This is particularly true of Comayagua, the project site. There is a full range of farming practices present in the area, ranging from large scale commercial farming for export to small subsistence farmers. The different groups of farmers each require different technologies and levels of application. The diversity of the audience and the relationship between the possible technologies cause special problems for the selection of a sample. A purely random sampling approach will be inefficient because of the number of individuals who would have to be sampled before enough of a particular category of interest was encountered to carry out a statistically valid study. For example, if the model farmer has very small holdings and can barely grow enough on that land to sustain his family, then the technologies that apply to him will be quite different from those that apply to a larger landowner who grows some food for consumption but primarily farms vegetables for sale in the city. The latter is much more likely to use irrigation for at least some of the crops in at least some of the seasons, and is also much more likely to use fertilizers and pesticides, to have access to credit, and to have frequent interaction with extension agents. A random sampling plan based on the entire population would have to sample many individuals before getting enough of the latter type to make useful inferences about the behavior of such farmers.

The sampling strategy proposed here is designed to provide the benefits of random or population-proportional sampling, but still enable small and focused studies to be carried out efficiently on specific subsets of the population. The core of the plan consists of the enumeration of a fairly large number of farm families with

identification of their basic demographic and land and crop patterns. The enumeration gives a group that may be many times larger than will ever be measured in any given study, but it is a group of known representativeness from which subsets can be sampled for specific tasks. Thus, if more efficient use of water on irrigated lands is promoted through the intervention, a subsample of farmers who irrigate can easily be drawn, and researchers can go straight to their farms. An additional benefit is that the characteristics of the irrigation subgroup relative to the population at large are known, so that possible constraints or facilitating factors can easily be identified.

This strategy is flexible and offers a number of advantages over pure random sampling. For example, surveys conducted at harvest time that involve crop-cutting to generate estimates of yield have a narrow timeframe during which they can be carried out. The enumeration group provides the ability to target quickly a group of farmers who have appropriate fields and who are known to have adopted a certain technology. They also can be compared to a random sample from among a subset of farmers drawn from the same enumeration group who meet similar criteria but who have not adopted the particular technology. In addition, the fact that they are both drawn from a representative enumeration group means that the two groups, adopters and non-adopters,can be compared with each other and with the population as a whole to isolate the characteristics that are associated with adoption.

The main advantages of this approach are that it permits efficient, closely targeted sampling at the same time that it provides information about the relationships between the subgroups and the population as a whole. It reduces some of the threat to validity caused by repeated interviews on a smaller sample, because the same level of precision of estimate can be attained by interviewing only a proportion of the larger enumeration group, thus saving much of the sample as "uncontaminated" by that measure.

The size of such a large sample group must be determined from more detailed information about the distribution of relevant characteristics of the local population, and about the specific technologies that will be the targets of the intervention. For planning purposes, a number of approximately 2000 has been assumed. Once the initial investment in enumeration, sampling, and interviewing the group has been made, only subgroups of sizes necessary for specific studies need be contacted. The entire sample, or some large randomly selected portion of it, can be remeasured annually to ensure that the overall population values are current.

Sampling under this strategy will have to be done under a multi-tiered, stratified, and clustered basis. The reasons for this are that no good sampling frames currently exist for rural Comayagua, and the logistical problems of visiting unclustered samples can be overwhelming. The stratification variables to be used will be based on the characteristics associated with the final technological objectives set for the intervention.

4. Control Groups

There are two basic threats to interpretation of findings from studies like these. One is that factors besides the intervention are generating changes (secular trends or history) that might masquerade as changes resulting from the intervention. The other is that participation in the study of the effects of the intervention alters the participants in ways that influence their measured characteristics or their reaction to the intervention (repeated measures and the interaction between repeated measures and the intervention effect.) The institution of appropriate control groups can provide protection against misinterpretation of data from the experimental groups.

The main protection against the first threat is to have a non-treatment control group -- that is, a group that is otherwise the same but that is not exposed to the intervention. This is often difficult in programs that use mass media, because most of the population will be exposed. In Comayagua, the broadcast components of the intervention might be carried exclusively on local or regional radio stations (as is the current Regional Office communication activity). The coverage of these stations is limited, so it should be possible to select a control group from an area that is similar but does not receive any part of the intervention. If intervention broadcasts are carried on one of the more popular national radio networks, such as HRN, the message coverage would be virtually nationwide and a pure, comparable non-treatment control would be extremely difficult to find. A decision about where to seek non-treatment controls will have to be finalized when the specifics of the broadcast plan are known.

It is possible to reduce the threat of the answers or the behavior of the experimental group becoming non-representative as a result of participation in the study. Under the proposed sampling plan, each individual would be contacted much less frequently than in a traditional repeated measures design, so the risk would be reduced from the outset. A second means of control is to use a post-test only group -- one that is measured only at the end of the intervention period. This group then represents a control against which the repeated-measures group can be compared so that the magnitude and type of the effects of repeated measurement can be estimated. The ideal way to create such a group is to preserve a random subsample from the initial enumeration, so that one is assured of random equivalence with the repeated-measures group.

5. Surveys and Special Studies

It is proposed that a plan of surveys and flexible focused studies be carried out that provide for fast response, comprehensive information, and efficient use of measurement resources. The survey component consists of annual or more frequent surveys of a large representative sample of farmers in the treatment area. This will provide knowledge about the overall levels of exposure, knowledge, behavior and impact. It will rely primarily on questionnaires filled out by trained field workers during interviews with individual farmers. The primary measurement methodologies are verbal self-report combined with on-site observation.

The most advantageous timing for such a survey is at harvest, if yield measures are to be incorporated, or at a time after the behaviors would have been performed, if yield measures are made separately. Thus, if yield measures are to be made separately, and if the behaviors of interest are soil preparation, it would be appropriate to survey after planting but before the busy season at harvest. Similarly, if the behaviors of interest are harvest or storage related, it would be better to conduct a survey after the harvest season is over. An argument for separating yield measurements from the large scale interviews is that the harvest period, during which direct measures such as crop cutting can be performed, is relatively short and is an especially busy time for the farmer. Limiting the focus during this period will permit more efficient use of the farmers' and the field workers' time.

In addition to intermittent large scale surveys, a program of continuous smaller scale studies is proposed. If the large survey activity is characterized as being a summative measure of impact, then the smaller studies can be described as investigations that put heavy emphasis on process as well as impact. This strategy of two distinct types of activities is proposed for several reasons. One is that the nature of the technologies to be promoted is quite diffuse and requires a multifaceted response with measures directly targeted to the details of the individual technology in question. Another is that the timing of the general crop cycles and the relevant behavior patterns within the crop cycle will vary markedly from technology to technology. Another is that given technologies will be appropriate for only some of the farmers, and a plan of separate, focused studies captures those cases in good detail without inefficiencies or oversampling.

As an example of a focused study, one that might be done for the case of growing a crop for export could have the following characteristics. Farmers in the main sample that have adopted the practice are identified through a combination of extension agents, community surveys,and records of credit or input supply organizations. Much is already known about these farmers because they are already members of the main sample. They are visited one or more times by field workers who interview them, observe their fields and production practices, and collect data on knowledge and behavioral changes. A comparison subsample of similar farmers who have not adopted the promoted practice could be drawn from the main sample for a parallel study of the differences between adopters and non-adopters, and for reasons given for not adopting. During these same visits, the field workers can carry out additional data collection for formative evaluation by assembling a focus group of farmers from outside the main sample to review draft messages.

The overall structure of this approach of surveys and special focused studies is based on the principle of using each technique to its best advantage while having the separate results cumulate into a coherent whole. An annual or semiannual major survey will provide the most important aggregate information on a large enough sample to produce precise estimates and detect significant differences in knowledge, behavior, and yield, even if the absolute magnitude of those

differences is relatively small. The use of focused studies the rest of the time maximizes the detail that can be obtained about any given technology, provides an opportunity to look at the process through which the technology is adopted, permits flexibility in responding to changes over time in how the intervention is structured, gives field workers the chance to collect data easily for formative evaluation, and smoothes the workload over time for the permanent field staff.

6. Measurement Methods

The range of measurement methods to be used in the large scale surveys and in the focused studies is very wide. Much of the data will be collected using interview techniques with individual farmers in which field workers administer a detailed questionnaire and record or code the farmers's responses. In addition, less-structured interviews should be conducted with extension agents, government officials, research station and FHIA staff, and community opinion leaders. Archival records maintained by the Ministry or others on such matters as production, weather, rainfall, and inputs will be used. An example of such data might be the farm registers being introduced now to farmers who are cooperating with some promoted behavior changes. On the registers the farmers record all of the inputs of labor, materials, time, and money that go into individual crops. These may provide a source of longitudinal data for assessing changes in farmer practice and productivity. If possible, data collected for other current projects will be included. This will be especially important for concurrent measures of yield, which are expensive to collect and are often done routinely for other agricultural development projects. If it is impossible to obtain measures of yield or profit from other sources, it may be necessary for the project to mount a significant effort in those areas on its own. Other data collection methods include direct observation in farming communities, extension agent diary keeping, farm record keeping, focused investigations into decision-making by farm families, market condition studies, controlled on-farm tests, farm budget studies, and risk-aversion studies. It is a great advantage to be able to sustain these studies over several years, because the long intervals between the times a farmer can decide to adopt and the lag time for secondary diffusion makes for a slow adoption curve.

7. Data Collection and Handling

The mechanics of collecting and handling data become extremely important in field research in developing countries. Our experience in carrying out similar projects has led us to emphasize these aspects in planning to ensure that they receive full consideration.

It is important to have at least a minimum steady work flow to enable one to keep a staff of experienced data collectors. Without this experienced core, it is difficult and inefficient to gear up for larger scale efforts using temporary employees. The recruitment and training period for field workers provides several opportunities for making later work more smooth. For example, if more field workers are trained than are needed, a pool is created from which one can draw later during periods of high intensity. The training of many

applicants for one position enables one to select the most skilled as permanent staff, and also serves to motivate all the students. And even if the excess trainees are not employed in this project, they constitute a contribution toward institutionalizing the empirical research in later Ministry efforts. The training period also provides the opportunity for large scale pretesting of potential measurement items, so that they can be improved before they are put into full scale use. This is particularly important for highly structured interview questionnaires with precoded response catgories.

Once data have been collected, the field staff should exchange and check each others work, do post-coding, and make sure that the identificaton codes are correct. Their work should be checked by a supervisor before data entry begins. The field supervisor's role is critically important. He or she should: frequently retrain the data collectors (prior to each focused study, for example); reinterview as a check on data collection reliability; oversee the coding of data to ensure accuracy and completeness; and take personal responsibility for especially complex or idiosyncratic coding. The workable ratio of field workers to supervisors is approximately five to one. It should never be worse than ten to one; more favorable levels -- three to one -- are preferable and need not be terribly expensive because the supervisor can conduct some of the data collection as well.

Data entry, summarization, and checking should be done locally so that any discrepancies or confusions that emerge can be resolved quickly and close to the source of the data. In the recent past, it has been difficult to accomplish this because low cost technology for data entry, verification, and statistical processing were not available. It is now possible, however, to use reliable microcomputers to enter and process large amounts of data. For this project we are proposing that such a system be used. The field office and the home office should both be equipped with identical microcomputers, mass storage devices, and software.

The importance of having local data analysis capability extends well beyond the cleanup of data. It permits fast summarization of evaluation data. It enables analysis to be done locally to the limits of the staff's abilities,and it offers the capability of training that staff up to a level of performance that makes institutionalizaton of the function possible. Extended data analysis will be carried out in the home office. This permits synthesis of reports across sites and frees the field office staff to concentrate on issues of instrument design and data collection, both of which are extremely demanding tasks.

G. Diffusion Activities

A key component of the pilot project is the provision for a series of diffusion activities aimed at achieving dissemination of information about the project's communication methodology and transfer to and institutionalization of this methodology within the technology development and transfer system of many countries throughout the developing world.

Honduras will be the host site for an international seminar highlighting the pilot project and the communication methodology being developed in the project. This seminar, to be hosted by the Honduran Agricultural Research Foundation (FHIA), will be attended by representatives of countries currently participating in or studying the feasibility of participating in the CTTA project. The seminar will focus on the experience of Honduras and other CTTA-collaborting countries in developing and applying the project's communication methodology. A program schedule for the seminar will be developed by AED, in consultation with the MNR/Pilot Project staff and FHIA's Communication Division (CD).

H. Reporting Requirements

Reporting requirements for the MNR/Pilot Project in Honduras are as follows:

1. Implementation Plan

A life of project implementation plan will be prepared and submitted to AID for approval. This plan will serve as a guideline for planning and decision making for the MNR/Pilot Project. This plan, which will be updated annually, will include: objectives, description of end of project status, inputs, methodology, reporting requirements, and a management plan (timeframe for key activities and budget). This document is prepared in compliance with this reporting requirement.

2. Integrated Action Plan

An integrated action plan will be prepared within six months following the arrival of the resident advisors and will be developed in cooperation with the MNR/Project staff counterparts. The integrated action plan will give emphasis to the priorities for the first 12 to 18 months of the project.

3. Interim and Final Reports

a. Monthly Reports

Monthly reports will be prepared and submitted to the MNR/Pilot Project Director, FHIA Director General, USAID/Honduras, AED, and AID/Washington CTO. The monthly report will summarize key activities, problems and proposed resolutions.

b. Semi-Annual Reports

Semi-Annual reports will be prepared and submitted to the MNR/Pilot Project Director, FHIA Director General, USAID/Honduras, AED, and AID/Washington CTO.

1. Report of activities and progress made during the reporting period and planned for the next period. This report will include updates and recommended revisions in the Implementation Plan and Integrated Action Plan.

2. Financial Report, including accounting by line item of expenditures incurred during the reporting period and project expenditures for the next period.

c. Trip Reports and Seminars

Trip reports for all international travel and for proceedings of seminars will be prepared and submitted to AED.

d. Summative Evaluation Reports

A minimum of two Summative Evaluation Reports are to be submitted

on the MNR/Pilot Project during the life of the project.

e. Final Report

A Final Report will be prepared at the conclusion of the project outlining all major activities undertaken during the life of the project, level of effort, and associated costs.

f. Informal Reporting

In addition to meeting the formal reporting requirements, frequent informal written and oral reports of progress and problems will be made by the AED's Chief-of-Party, and other technical assistance specialists as appropriate, to the MNR/Pilot Project Director, FIAH and AID.

I. Management

This project component will be carried out over a four-year period by the AED and Applied Communications Technology, Inc. (ACT). ACT will be responsible for conducting the summative evaluation for the pilot project.

1. Technical Assistance

Technical assistance will consist of two resident staff: a Communication Advisor for 48 person-months and a Evaluation Specialist for 48 person-months. Candidates for these positions are currently being screened. It is hoped that selection and approval of the two candidates will be completed by mid-December 1985, and that the personnel will move to Honduras no later than February 1986.

Short term technical assistance totaling 10 person-months will be provided over the life of the project. The specific types of technical assistance assistance will be determined jointly by the MNR, the resident advisors, the AED contractor team, and AID.

2. Time Phase Plan

Exhibit 1 on the following page is a life of project implementation plan. The timing of these activities will change during the project. The integrated action plan and the semi-annual reports will specify proposed changes in the overall implementation plan.

3. Primary Activities for Next Six Months

The following activities will be carried out over the next six months:

Nov/Dec 1985
- Recruit, select, and obtain approval for resident commmunication advisor and evaluation specialist
- Develop equipment specifications for communication equipment

Jan/Feb 1986
- Resident staff arrive at post
- Procurement plan developed and initiated
- Evaluation plan completed and initiated
- Meetings held with representatives from new government

Mar/Apr 1986
- Target audience analysis and developmental investigation initiated
- Integrated work plan developed based on results of investigation

COMAYAGUA

PROJECT IMPLEMENTATION

A. Pilot site within the Country
   1. in-country visit to confer with host country and USAID officials to identify sites that meet selection criteria, select region for pilot site, and make preliminary determination of available ag tech to use
   2. select sub-sites within the pilot region
B. Negotiate Letter of Agreement
C. CTTA Field Director (Agricultural Communications Specialist) on site
D. Prepare Implementation Plan
E. Prepare Evaluation Plan
F. Investigate available agricultural technologies in depth and determine those to be used in communication intervention
G. Conduct initial developmental investigation
H. Establish communication program objectives
I. Develop and establish internal project management systems
J. Initiate product or concept testing
K. Provide in-service training of communications staff in technical skills
L. Provide in-service training of extension staff and other diffusion agents in communication skills and technical agricultural context
M. Determine media to be used in communication interventions and make arrangements for their use
N. Define and segment project's primary and secondary target audience
O. Develop message content for targeted change
P. Refine program strategy included in implementation plan
Q. Establish feedback and feedforward systems
R. Conduct training field trials
S. Develop and implement educational programming system
T. Establish and implement coordinating mechanisms
U. Conduct pretest and produce educational materials for media selected
V. Begin communication intervention to primary target audience
W. Identify potential members for networking and develop and implement system for information flow to, from, and among them
X. Design, conduct and analyze formative evaluation studies
Y. Review, replan and adjust implementation plan

SUMMATIVE EVALUATION

A. Develop evaluation plan
B. Enumerate target population
C. Design and conduct survey
D. Analyze and report on results of survey
E. Conduct focused studies

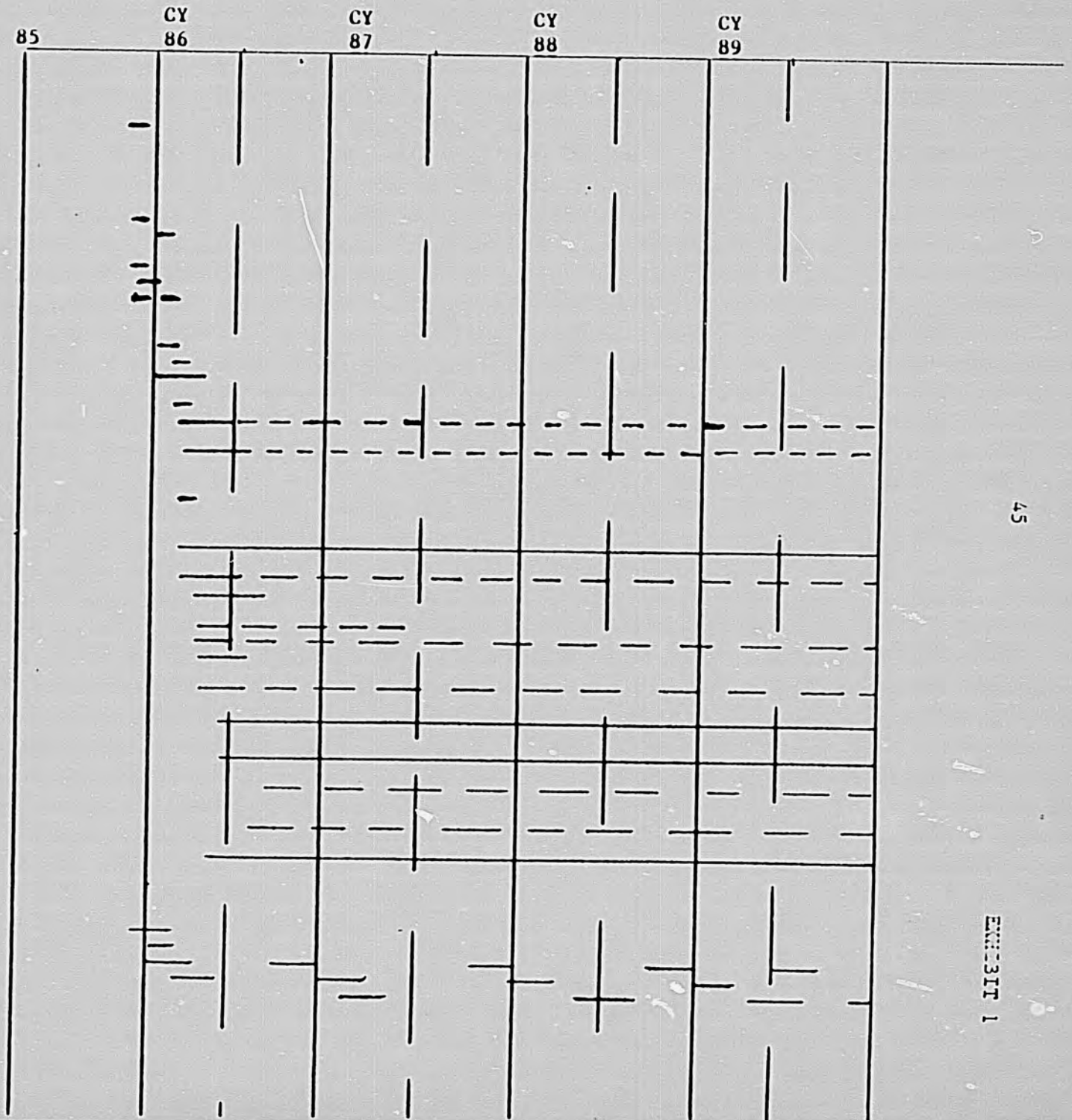

EXHIBIT 1

V. FHIA

A. Objectives

The purpose of this project component is to assist FHIA in expanding and improving the Honduran agricultural research system to make it more responsive to the technological needs of farmers. To achieve this purpose, the research system must be integrated into a larger technology development and transfer process of which a viable and active communication subsystem is an integral part. An important aspect of this program is the adoption and integration of long-term systematic communication planning and design procedures into the Honduran agricultural technology development and transfer system.

The objectives of this project component will be to assist FHIA in:

1. Creating and operating a Communication Division (CD) with a communication system integrated into FHIA's operations;

2. Training a cadre of competent communication-related personnel who, in the future, can function effectively to serve the information neeeds of FHIA and its various audiences;

3. Strengthening FHIA linkages and communication with other national and international research institutions and programs and input delivery, training, marketing, and other entities as appropriate to the farmer; and

4. Designing and implementing a development strategy to secure the short- and long-term funding required to support FHIA and its programs.

B. End of Project Status

Project outputs related specifically to the Honduran Agricultural Research Foundation (FHIA) are expected to include:

- A developed and functioning Communication Division (CD) and programs, with the communication system and program institutionalized and a cadre of competent communication-related personnel developed to the point that the Division can continue (without further external technical assistance) to function and develop to better serve the needs of its various audiences, including the diffusion of FHIA-generated and adapted technology to Honduran farmers.

- Improved farmer agricultural production performance in the pilot region resulting from use of existing and new/improved technologies developed through FHIA research.

- The FHIA/CD and MRN/UCA functioning in close coordination on a regular basis to maintain the core communication linkage system.

C. Inputs

The inputs to the FHIA component of the CTTA Project will be provided by USAID through AED and by FHIA as follows:

1. USAID will support the FHIA component of the CTTA Project by providing the following through AED: Two full-time resident advisors (RAs)--a Communication Specialist for 36 person months and a Development Specialist for 24 person months; Short term technical advisors up to 39 person-months over the life of the project in areas such as evaluation, radio/audio, graphic, print, video, communication equipment, training, and information systems with the specific allocation of each type of short-term technical assistance to be identified on the basis of evolution of need as the project progresses; procurement of equipment including printing, graphic arts, photography, video, visual aids, audio, data processing, and other office-related equipment as necessary; up to three project vehicles; and procurement of relevant journals and publications to upgrade and expand the FHIA library.

2. FHIA will support the FHIA component of the CTTA Project by providing the following: counterparts, office space, including utilities, furniture, and telephone lines for the counterpart personnel and advisors; budgetary resources for the implementation of this project- including communication materials and supplies, and facilities for conferences, meetings, and training, as appropriate; and commitment of adequate professional and administrative/secretarial support to implement this project and carry it through the project life cycle of four years.

D. Methodology

The Communication Division functions will include planning, production of materials in various media, dissemination of information tailored to the needs of each audience, communication related training, investigation and evaluation, coordination and managment of the communication network, and to a more limited extent) public relations.

The Communication Division will be organized into four units which incude the Communication Unit, the Training Unit, the Library Unit and the Development and Public Relations Unit. During the first six months of the project's implementation, an integrated action plan will be developed which establishes priorities and procedures and defines responsibilities. The activities to be carried out in developing each unit are described below.

1. Communication Unit (CU)

CTTA-provided technical assistance staff will assist FHIA in establishing and oganizing the CU in:

a. Developing long-range and annual work plans for the CU;

b. Developing and implementing the communication strategy and media plan;

c. Formulating a strategy and long-range plan for development of a comprehensive communication-related investigation and evaluation program;

d. Designing and conducting communication-related studies and evaluation;

e. Training CU staff in evaulation, print, audio, graphics, video, and training methodologies;

f. Preparing operational manuals for the CU;

g. Developing the specifications, procuring and supervising the installation of the CD equipment;

h. Determining need (if any) for additional or modified physical facilities for the required equipment.

2. Training Unit (TU)

CTTA-provided technical assistance staff will assist FHIA in establishing and organizing the training unit by:

a. Developing a long-range training plan that identifies a training schedule and resource requirements for meeting identified existing and projected training needs;

b. Developing technical exchange and in-service training functions;

c. Establishing coordinated activities with other training entities; and

d. Preparing a basic training manual.

3. Library Unit (LU)

CTTA-provided technical assistance staff will assist FHIA in expanding and improving its library by:

a. Acquiring budgeted library books, periodicals, and other reference materials;

b. Designing a microcomputer-based Documentation System;

c. Preparing detailed specifications and cost estimates for the required equipment;

d. Preparing qualification and job description statements for Documentation System staff positions;

e. Procuring and installing Documentation System equipment and bringing the equipment into operation;

f. Training FHIA Documentation System staff in the organization and management of the system; and

g. Preparing operational manuals for the Documentation System.

4. Development and Public Relations Unit (DPRU)

CTTA-provided technical assistance staff will assist FHIA in establishing and organizing the Development and Public Relations Unit by :

a. Developing long-range and annual workplans for the DPRU;

b. Developing a strategy for identifying potential donors and research projects which would attract donor and/or contract funding; and

c. Developing and conducting public relations programs that meet the information needs of FHIA's various audiences.

E. Reporting

Reporting requirements for the FHIA component of the CITA project in Honduras are as follows:

1. Implementation Plan

A life of project implementation plan will be prepared and submitted to AID for aproval. This plan will serve as a guideline for planning and decision making for the FHIA project component. This plan, which will be updated annually, will include: objectives, description of end of project status, inputs, methodology, reporting requirements, and a management plan (timeframe for key activities and budget). This document is prepared in compliance with this reporting requirement. The implementation plan will be modified as necessary upon request from any of the parties and by mutual agreement to adjust the project to changes in circumstances or to improve it.

2. Integrated Action Plan

An integrated action plan will be prepared within six months following the arrival of the resident advisors and will be developed in cooperation with the FHIA counterparts. The integrated action plan will give emphasis to the priorities for the first 12 to 18 months of the project.

3. Interim and Final Reports

a. Monthly Reports

Monthly reports will be prepared and submitted to the FHIA Director General, USAID/Honduras, AED, and AID/W CTO. The monthly report will summarize key activities, problems, and proposed resolutions.

b. Annual Reports

Annual reports will be prepared and submitted to the FHIA Director General, USAID/Honduras, AID/W CTO, and AED.

1. Report of activities and progress made during the reporting period and planned for the next period. This report will include updates and recommended revisions in the Implementation Plan and Integrated Action Plan.

2. Financial Report, including accounting by line item of expenditures incurred during the reporting period and project expenditures for the next period.

c. Trip Reports and Seminars

Trip reports for all international travel and for proceedings of seminars will be prepared and submitted to AED.

d. Final Report

A Final Report will be prepared at the conclusion of the project outlining all major activities undertaken during the life of the project, level of effort, and associated costs.

e. Informal Reporting

In addition to meeting the formal reporting requirements, frequent informal written and oral reports of progress and problems will be made by AED's Chief-of-Party, and other technical assistance specialists as appropriate, to the Foundation's Director General, the Ministry of Natural Resources, and AID.

F. Management

This project component will be carried out over a four-year period. Contractor services and assistance to FHIA will be provided by Cornell University's College of Agricultural and Life Sciences as subcontractor, under the guidance and supervision of AED.

1. Technical Assistance

Technical assistance will consist of two resident advisors: a Communication Specialist for 36 person-months and a Development Specialist for 24 person-months. Candidates for these positions are currently being screened. It is anticipated that selection and approval of the two candidates will be completed by mid-December 1985, and that the personnel will move to Honduras no later than February 1986.

Short term technical assistance totally 39 person-months will be provided over the life of the project. The specific types of technical assistance specialists will be determined jointly by FHIA, the resident advisors, and AED's contractor team.

2. Time Phase Plan

Exhibit 2 on the following page is a life of project implementation schedule. The timing of these activities will change during the project. The integrated action plan and the semi-annual reports will specify proposed changes in the overall implementation plan.

3. Primary Activities for Next Six Months

The following activities will be carried out over the next six months.

Nov/Dec 1985 • Recruit, select, and obtain approval for resident advisors
Jan/Feb 1986 • Develop equipment specifications for communication equipment
• Resident advisors arrive at post
• Procurement plan developed and inititated
Mar/Apr 1986 • Integrated work plan developed

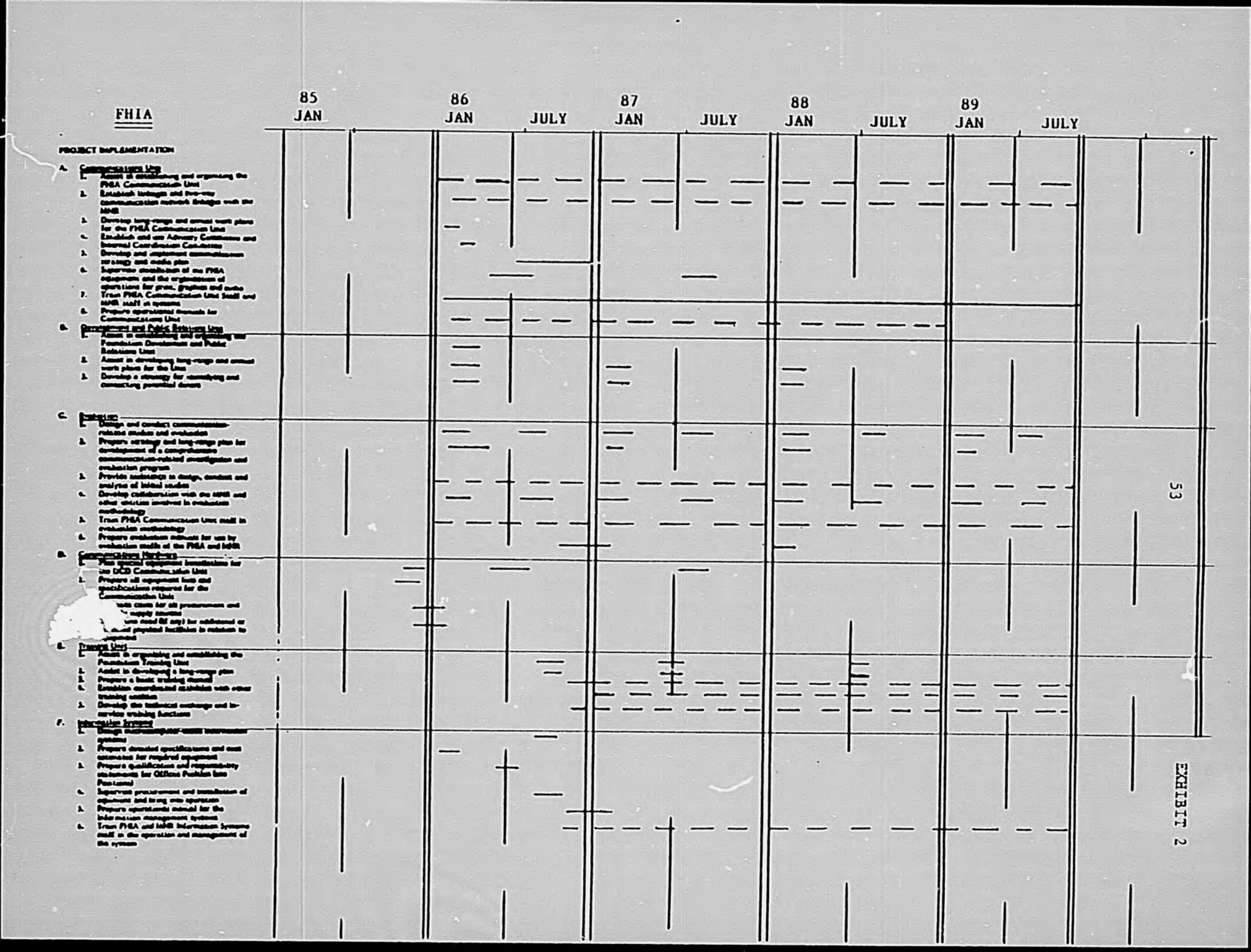
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EXHIBIT 2

VI. Linkages Between FHIA and MNR/Pilot Project

The Communication Division (CD) of FHIA can be an effective support mechanism only to the extent that it is integrated into the total Honduran agricultural technology development and transfer system. For such integration to occur, FHIA's CD and the MNR Agricultural Communication Unit (ACU) must function as a single subsystem that is involved in and effectively supports planning, programming, feedback, and evaluation of both Research and Extension.

Relationships between FHIA's CD and the MNR's ACU will be developed initially through a series of collaborative activities. Such activities will be designed to establish functional linkages that will facilitate the two-way flow of information among research, extension, and Honduran farmers, and economize on costs.

The functional areas in which collaborative activities will be developed include: communication planning; investigation of farmer beliefs and practices related in technoogy use; development, pretesting, production, dissemination, and evaluation of materials in various media; coordination andmanagement of a comprehensive agricultural communication network; and communication-related training. An illustrative but not exhaustive list of collaborative activities include:

1. Collaboration in developing, maintaining, and operating a communication network linking together all organizational participants and audiences of FHIA and the MNR/Pilot Project, as appropriate.

2. Collaboration in organizing courses on technical agriculture for extension workers and in organizing and conducting communication-related training courses for research and extension staff.

3. Collaboration in designing and conducting studies at the farmer level, particularly in areas in which research staff have an input (such as field days, on-farm adaptive research trials, demonstrations, publications, radio programming, etc.);

4. Collaboration in pretesting and conducting impact evaluations of materials produced by the FHIA/CD and MNR/ACU.

5. Collaboration in production of materials in the various media (including radio) for dissemination directly to farmers.

6. Cooperation in the procurement and efficient utilization of FHIA and MNR communication-related equipment.

Linkages will be strengthened and institutionalized during the course of the CTTA Project, based on experiences gained through the types of collaborative activities indicated above.

In developing the FHIA and MNR/Pilot Project components of the CTTA Project, project staff will seek to continue and further develop the "enlace tecnologico" (or "technological linkage") program

which is now MNR policy, with the objective of achieving more joint research-extension planning and implementation, and evaluation and dissemination of results obtained. CTTA project staff will explore, in the pilot project region, ways in which coordinated and/or joint activities can be developed that will foster establishment of the desired institutional linkages between FHIA/CD, MNR/ACU, and MNR/RD in the MNR/Pilot Project region (Comayagua).

CTTA project staff, including the heads of the FHIA/CU and MNR/ACU, the RA in agricultural communication assigned to FHIA's CD, and the RA in agricultural communication assigned to the MNR/Pilot Project, in consultation with the FHIA/CD and MNR/Extension Directors, will plan and coordinate joint communication-related activities and information exchange, particularly as they relate to the Comayagua pilot project (in which case the MNR/RD communication specialist and the MNR/RD director, will also participate).

A microcomputer-based documentation system to be established in the Library Unit of FHIA's CD will be linked into the MNR/ACU's microcomputer to provide immediate access to research information.

Short-term technical assistance provided to FHIA also will assist in staff training and program development for the MNR/ACU and the MNR/Pilot Project. The resident evaluation specialist for the MNR/Pilot Project will also consult with the Communicaton Unit (CU) of FHIA's CD on evaluation needs, strategies, techniques, and opportunities for collaboration in the development of evaluation activities.

Other potential strategies and mechanisms for developing collaborative linkages in support of program objectives will be identified in the integrated action plans for the MNR/Pilot Project and the FHIA CD components, respectively, of the CTTA Project.

Appendix 1

Appendix I

COMMUNICATION CAPABILITY IN COMAYAGUA

The department of Comayagua is well served with radio transmitters. In addition to reception of the national chains (such as HRN), there are both regional and local stations that cover varying areas. In the city of Comayagua, there are six transmitters, three regional and three local. The three regional stations cover the entire Comayagua valley, plus adjacent parts of the neighboring departments. The three regional stations are Radio Impacto, Radio Corporacion, and Radio Comayagua. All are commercial stations broadcasting in the AM bands. The three local stations are Radio Sistema, Radio Stereopunto, and Radiolandia, all of which are FM stations with limited broadcast radii. At least two of them broadcast in stereo.

Three more transmitters are located in the city of Siguatepeque, which is situated at the north end of the valley of Comayagua. Two of these are regional AM stations -- CentroRadial and Radio Sensacion. The third, Novedades, is a local FM station. Finally, a tenth transmitter is located in the town of La Paz. It is a religious station called Maranata.

The Regional Office of MNR previously broadcast on Radio Corporacion, which they say has the highest listenership among the campesino audience. However, when the contract last came up for renewal, the station and the Regional Office were unable to agree on a price for the radio time. The asking price for the half hour between 5:30 and 6:00 p.m., five days a week, was 500 Lempiras per month. The Regional Office subsequently contracted with Radio Comayagua for the same time period and frequency of broadcast. The agreed upon price was 150 Lempiras per month. The Regional Office reports that Radio Comayagua is the second most popular station among campesinos.

The Regional Office's use of radio programming in support of its work began about nine years ago with the startup of a weekly radio program. Five years ago, the frequency was changed from weekly to five days a week, and it has apparently been in operation continuously since then. The program uses a magazine format with segments on local agricultural news, interviews with farmers and agricultural experts, technical advice on the topic of the day, and similar content. In the last year, the second person nominally assigned to the communicaton unit has been away, leaving an impossible production burden on the sole remaining person in the unit. As a result, new production is falling behind, and many of the broadcasts are repeats of previous transmissions. The communication staff feel that this is losing them both audience and credibility.

Appendix 2

Appendix 2

SECRETARIA DE RECURSOS NATURALES
DIRECCION REGIONAL - COMAYAGUA
DEPARTAMENTO EXTENSION

BENEFICIARIOS ASISTENCIA TECNICA
TECHNICAL ASSISTANCE BENEFICIARIES

AGENCIAS*	GRUPOS CAMPESINOS(1)	COMITES AGRICOLAS(2)	OTRAS ORGANIZ.(3)	PRODUCTORES INDEPEND.(4)
	#. SOCIOS	#. SOCIOS	#. SOCIOS	#. SOCIOS
Comayagua	15/367	3/40	-	1
Ajuterique	3/147	1/8	-	70
La Villa San Antonio	13/205	1/12	1/12	50
La Paz	7/103	2/19	1/5	67
San Jerónimo	3/166	3/60		30
El Rosario	-	27/333		101
San Luis	6/112			
Siguatepeque	4/48	10/144		85
Taulabé	15/242	1/12	2/23	4
	79/1390	48/628	4/40	408

*AGENCIES:

(1) Campesino Groups
(2) Agriculture Committees
(3) Other Organizations
(4) Independent Producers

Appendix 3

AGRICULTURAL TECHNOLOGY AND TECHNOLOGY TRANSFER IN COMAYAGUA, HONDURAS

I. Comayagua Agriculture

On a comparative basis, the agriculture of the Comayagua region of Honduras is more highly developed and commercialized than most other regions of Honduras. Though the large and medium sized farms generally produce crop commodities for marketing, many small farm operators also market some commodities in addition to those produced for family consumption.

Small farms range in size from 1 to 5 manzanas (1 mz. = 0.7 ha.), medium sized farms average 5-15 manzanas, and large farms over 15 manzanas. Most of the agricultural land is in the small and medium sized farm sector. Small farms generally are located on hillsides while the medium sized and large farms occupy more gently sloping and level land.

The soils vary in depth from 30 cms. to more than one meter, though a higher proportion of them are shallow, particularly those on hillsides. Hillside soils have a sandy clay loam texture while valley soils are clay loams. Surface and subsoil horizons are similar in texture. Valley soils are in general, more productive than hillside soils, but the soils of both areas are low in nitrogen and phosphorus. Plant available potassium levels, however, range from medium to high.

The climate of the region includes two seasons, rainy and dry. The rainy season begins the last of May and extends through October, while the dry season begins in November and continues through May.

The principal rainy season crops grown on small farms are maize and beans; on medium sized farms, maize, beans and rice; and on large farms, maize and rice. Crops grown under irrigation during the dry season include tomatoes, cucumbers, onions and snowpeas on small and medium sized farms, while rice, cucumbers and snowpeas are grown on the larger farms.

Research underway with application to small farms includes experiments with animal traction implements, crop management, soil conservation, drought resistant crops and varieties, and livestock. Research being considered with application to small and intermediate size farms includes soybean variety trials, windmills, and implements powered by biomass energy. Soybean varietal trials are being considered for medium and large sized farms.

Input costs (a partial list) in crop production at 1985 prices include labor at 5 lempiras (L/per day), urea at L 28, diammonium phosphate at L 43, and 12-24-12 at L 36 per 100 lbs., improved maize seed at L 50/100 lbs., improved rice seed at L 65/100 lbs., oxen (1 pair) at L 1,000-1,500, a small 18 horsepower tractor at L 12,000, a two wheel walk behind tractor at L 3,000-3,500 and a one bottom turning plow (locally made) at L 250-300.

II. The Extension Service in Comayagua

Extension staffing may be influenced by a loosely organized structure of the farm sector. There are farm communities, commodity-oriented associations, and cooperatives, all of which have a designated or understood leader, or directive committee. Much of this organization is for the advantages gained by group purchasing and marketing, but underlying the economic advantages and perhaps of primary importance, is a social or cultural base.

Such a structure is highly beneficial to the extension service, particularly to the extensionists and promoters, in transferring technology to the farming public. By working closely with the leaders, they can extend their educational/technology transfer programs. Though extension staffing is low, it is important to recognize the advantages gained in working with and through community and organizational leaders in reaching the farming public. Another advantage in Comayagua is the general acceptance of new technology by the farmers. As a group, they tend to manage their farms similar to that of a business.

The Comayagua extension staff consists of 6 professionals in the Central Office and 24 extensionists and 8 promoters in the outlying areas. Each extensionist or promoter contacts the same 40 families each month throughout the year. Thirty to 35 are added to this number during the course of the year. The number of contacts with these families decreases with time but periodic follow-up is continued. Only 10 percent of the farm population is directly contacted while indirect contact is made with approximately 35 percent. Eighty percent of the extensionists' or promoters' working time is directly to the small farm sector, 15% to medium sized farm operators, and 5% to large farm operators. About 500 farm visits are planned per year by each extension worker and they plan to conduct/participate in 15 field days.

Extensionists and promoters receive an average of three in-service training courses per year, each of 5 days duration. Course subject matter includes extension techniques, advanced technology in crop production and improvements in family living.

The research staff at Comayagua works with 5 crops, or crop areas (for example horticulture) and conducts approximately 20 field trials/experiments for each crop discipline.

III. Technologies

The technologies described below were recommended by Honduran professionals of the Ministry of Natural Resources (MNR), Fundacion Hondurena de Investigacion Agricola (FHIA), and the Escuela Agricola Panamericana, as having good potential for the improvement of the agriculture in the Comayagua region. The method and form of the technology transfer process must be developed in accordance with the findings of target audience analysis mass communication technology, and the particular technology. Most, if not all, technologies can be divided into component parts which are more readily understood by farmers. All of the technologies described will need the results of target audience analysis and feedback to customize the methodology for their transfer to the farming public.

Sources of technologies include regional research and extension centers of MNR, FHIA, Escuela Agricola Panamericana at Zamorano and international research centers such as CIAT and CYMMIT. Technologies pass through several stages before they are accepted into the Extension Agency's plan of work. The first stage involves identification of production problems and its general distribution using information gained from area reconnaissance, visits with farmers, and other means. During stage two, researchers develop and refine alternative solutions to the problems identified. In the third stage, the alternative solutions are tested under controlled conditions. The more promising treatments or technologies are identified during this stage. Three or more years are often required to complete and testing process. The fourth stage involves taking the newly developed technology(ies) to the fields of the farmers for testing. Extension and research workers cooperate in conducting these field trials. Two to three years of field testing is common. Finally, the technology is demonstrated at the farm level by extensionists, usually by components, but possibly as a package.

A. Technologies Appropriate for Irrigated Agriculture in Comayagua

1. Technology 1: Increasing efficiency of irrigation.

Farmers in Comayagua generally make extravagant use of irrigation water which reduces the number of hectares that could be irrigated. The administration of irrigation water use is the responsibility of the Ministry of Hydraulic Resources. Its goal is to increase efficiency in the use of water and to distribute that saved to additional farmers.

Part of the problem with inefficient water use relates to its low cost to the farmer. Also, irrigation water flows through field laterals at a [illegible] rate, resulting in low infiltration. Using siphon tubes to transfer water from the main irrigation channel to field laterals reduces the rate of flow and increases the percent of irrigation water that infiltrates into the soil.

Though direct savings to the farmer is low, the micro-environment for the crop is improved, salt accumulation in the soil from the irrigation water is reduced, and more land could be irrigated with the adoption of siphon tube irrigation.

2. Technology 2: Control of botritis and mildew in the production of onions with the use of approved fungicides.

The objective in bringing this to the attention of farmers is to familiarize them with the problem and the effectiveness of fungicides in its control. Treatments should include a no-treatment control and an additional treatment for each fungicide or combination of fungicides to be compared.

3. Technology 3: Production of vegetables on raised beds.

The general practice is to flood the area (flat land irrigation). This practice creates a moist and humid condition which favors diseases and mildew. By using raising beds and irrigation in the channels between them, vegetables can be grown on a soil surface that is free of water while the root

system obtains soil moisture through lateral seepage from the irrigation channels. The objective of demonstrating this practice is to show farmers how the beds are most efficiently made and their effectiveness in controlling diseases and mildew in vegetable production. It is particularly advantageous practice in the production of onions but may also be suitable for other vegetables.

4. Technology 4: Trellising versus ground growing of cucumbers.

Traditionally, cucumbers are grown on the ground, are heavily irrigated and over-fertilized. By trellising much less fertilizer is needed and the quality of the cucumber is improved. The objectives in continuing to demonstrate this technology is to increase the use of trellising, to reduce the use of fertilizer to the levels indicated by research and to improve irrigation management.

5. Technology 5: Vegetable variety trials.

A constant supply of new vegetable varieties differing in appearance, flavor, yield capability, and other properties are being developed by plant breeders. These must be further screened by researchers to determine their potential for a particular region or market. Vegetable variety trials provide an effective way to introduce promising new varieties to the farming public. Farmers attending community field days can, through observation and obtaining information on the advantages of each variety, decide if a new variety will be beneficial to their operation.

6. Technology 6: Processing tomato trial with and without staking.

The purpose of such a demonstration is to compare new processing tomato varieties with those commonly grown and their performance under staked and non-staked management. If yields of marketable fruit are not improved by staking for certain varieties it may be economically advantageous to grow a variety that performs well without staking. Two fertilization programs could be included in the trial to check yield and quality responses of the various varieties to differences in fertilization.

7. Technology 7: Effect of nitrogen on yield and quality of the tomato variety, Napoli, or other varieties.

Farmers may be applying higher than necessary amounts of nitrogen which adversely affects quality and the level of disease in tomatoes. Three to five nitrogen levels need to be compared for one or more tomato varieties to demonstrate the effect of nitrogen application rates on yield and quality of fruit.

B. Technologies Appropriate for Unirrigated Agriculture in Comayagua

1. Technology 8: Chemical weed control in soybeans.

Soybeans are not grown extensively in the Comayagua region, but there is interest in expanding the area planted. Weeds are a serious and labor-intensive problem. Though herbicides for weed control add directly to the costs of producing soybeans, labor to erradicate weeds contributes comparative costs. The purpose of such a demonstration is to compare weed control in soybeans using manual labor or different herbicide treatments. Effectiveness of the various treatments, formulation of the solution, and method of application would need to be compared and discussed by extensionists/researchers.

2. Technology 9: Maize variety trials.

The objective of conducting maize variety trials is to inform and to show farmers the varieties and hybrids that are available to them, their yield potential, the quality aspects of each, growth characteristics, plant nutrient requirements and associated costs. Varieties used by farmers as well as hybrids recommended by MNR researchers and extension agronomists should be included in the trials. Additional hybrids may be obtained from CIAT and/or CYMMIT. These research organizations may have hybrids that have particular application to the climate, soils, maize pests, and food requirements of the Comayagua region.

A stepwise procedure for establishing a maize variety trial is described below.

- Obtain seed of the varieties and hybrids to be included in the field trial. Ascertain their availability to farmers and determine viability of the seed.

- Take a representative sample of the plot area and have it analyzed to determine soil amendment needs. Treat half of the plot area similar to what farmers practice and the other half as determined by soil test results. Plant varieties and hybrids across both treatments. If a statistical basis for making recommendations is desired, replication and randomization of varietal plots in each replication will be necessary.

- Plant about the last of May using the plant population, between row spacing and within row spacing recommended by MNR extension agronomists. Use three plots and harvest center row for yield data. Harvest the portion of the row with the farmer treatment separately from the portion of the row where the soil has been amended based on soil test results.

- Apply pesticides if needed, in accordance with established recommendations.

- Use traditional practices of farmers for curing and harvesting.

- o Determine per hectare for each variety the yield, plant population, number of stalks lodged, number of barren stalks, and resistance to disease and insects.

- o Conduct a field day for farmers, interested people, agribusiness personnel and professionals, at time of harvest. The harvested corn from the center row of each variety should be piled at the end of the row for inspection by field day participants. Yield data, adjusted to desired moisture percentage, and other maize characteristics should be noted and discussed for the people attending. Harvest farmer practice part of row separately from part of row treated in accordance with soil test results.

3. Technology 10: Planting density in maize.

Maize yields can vary with variety and plant population per manzana. Varieties differ as to optimum plant population for a given moisture regime. It is therefore helpful to farmers to show them the performance of different maize varieties using different plant populations per manzana. The spacing between rows should be constant. Plants per manzana is then controlled by the spacing between hills within the row. The general layout for this demonstration would be similar to that of technology number 8 for maize variety trials.

4. Technology 11: Phosphorus use in crop production.

Hillside soils of the Comayagua region generally are low in phosphorus and crops respond dramatically to applications of high phosphorus fertilizers. The objective of a field trial to demonstrate crop response to phosphorus is to increase awareness of the problem and to relate increase in yield to the economics of using high phosphate fertilizers. The soil area used for the demonstration must be analyzed to determine plant nutrient needs. The demonstration should include the fertilization practices of the farmers as well as one based on soil test results. An additional treatment, using composted plant residues, could be added to demonstrate the benefits of using compost as a source of phosphorus as well as other plant nutrients. Including compost as a treatment provides a minimal cost, but labor intensive practice, that may be of interest to farmers with limited financial resources and surplus family labor.

5. Technology 12: Supplying the plant nutrient needs of rice.

Rice is under-fertilized by many farmers. The importance of using the recommended amounts of plant nutrients could be demonstrated to farmers using their standard fertilization practices to compare with recommended amounts of nitrogen, phosphorus and potassium. The recommended treatment should be based on soil test results. Data would need to be taken on yield, costs of fertilizer inputs for the two treatments, soil test results, and the economic return on each fertilization program for presentation to farmers during field days and at production meetings on rice, or in mass media communications.

6. Technology 13: Slug (Babosa) control in beans in El Rosario area in Comayagua.

Research on bean slug control by Dr. Keith Andrews and associates at the Zamorano School in Honduras has defined the life cycle of this pest and they have developed effective measures for its control. Most beans are planted in October. To control or eradicate the slug, it is essential to apply treatments during the growing season of the corn crop preceding the bean crop. Adequate control is much more difficult or impossible if farmers wait to apply treatments after slugs have appeared in the bean crop. Several treatments are listed below which can be applied singly or in combination depending on the seriousness of the slug problem and adequacy of the treatment.

If complete eradication is achieved, reinfestation of a field will not occur to a significant degree for at least a year. Treatment around the perimeter of a field between host weed plants and the growing crop could prevent reinfestation. The objective of the slug control program is to create among farmers an understanding of its life cycle and how the slug, through proper control measures, can be controlled or eradicated from their bean fields.

Bean Slug Control, Practice 1. Maintain maize crop totally free of weeds after it has reached a height of 0.25 to 0.50 meters. This practice reduces the slug population by eliminating its food supply. The elimination of weeds also conserves soil moisture and plant nutrients for the maize crops.

Bean Slug Control, Practice 2. Rake residue or surface of soil into small piles between the rows of corn. Slugs, after a night of feeding, take refuge under the piles as daylight emerges. The residue piles are turned over every few days during the early morning hours to expose the slugs, which are then destroyed. Slugs are an intermediate host to a parasite that is harmful to man. To prevent infection it is necessary to carefully wash hands, as well as the tools used for destroying the slugs.

Bean Slug Control, Practice 3. Oil or similar type cans with the tops removed are placed in a maize field so that the tops are even with or slightly below the surface of the soil. A small amount of poisoned bait is placed on the bottom of the can, which is then covered with a roofing tile. The bait attracts the slugs into the can where the babosa eventually die from consumption of the bait. Slugs move approximately two meters during the night and, therefore, the baited cans or traps should be spaced two meters apart. The effectiveness of slug bait declines with time and when rains occur. This makes it necessary to empty and rebait the traps every 7 to 10 days. This control measure makes efficient use of bait, but is labor intensive.

Bean Slug Control, Practice 4. This practice, which is similar to the baited trap technology, is less labor intensive but more expensive. It involves broadcasting the poisoned bait on the surface of the soil in the maize field. Due to the reduction of its effectiveness with time, particularly if rains occur, periodic reapplication is necessary.

The present slug bait exists in a loose form and is easily washed away with rain. Since a pellet-making machine is expensive, a cheaper way of making pellets, using locally available materials, is being investigated in Danli.

If successful, the process will reduce the cost of slug control by reducing the number of applications.

IMPORTANT: Always use gloves or cover hands with plastic bags and cover mouth with wet hankerchief when using or handling slug bait or pesticide chemicals of any kind. Wash hands after each application or if chemical gets on the skin. Prevent contamination of eyes and store out of the reach of children.

7. Technology 14: Leaf-hopper control in beans.

Leafhoppers extract fluids from the bean plant and in so doing reduce its vitality and yield. Plants appear wilted, similar to their appearance when deficient in moisture. Because of their small size, a farmer may not be aware of the presence of leafhoppers until considerable damage has been done. Close inspection is required to determine their presence, or the symptoms of their presence, in beans. The objective in educating the farmer on leafhopper control in beans is to increase his expertise in detecting its presence in the bean crop, when to treat, what insecticide to use, and how to apply it. Entomologist Emily Vasquez, with the Ministry of Natural Resources, has developed an educational program for its detection, level of incidence in the field, and in insecticide spray program, should the infestation level indicate that it is needed.

8. Technology 15: Bean Pod Weevil Control in Beans.

Damage from this insect occurs when the eggs, which are deposited during the flowering stage of the plant, hatch into larvae that feed on the beans forming in the pod. An effective insecticide is available for weevil control. Program emphasis needs to be on familiarizing the farmer with the appearance of this insect during its egg-laying stage, what insecticide to use, when to treat, and how to apply the insecticide. The program for assessing level of infestation in the bean field, the need for applying the insecticide, and time and method of application is available from Emily Vasquez, Entomologist, Ministry of Natural Resources.

9. Technology 16: Family gardens.

Fresh vegetables and fruit are often lacking or inadequate for proper family nutrition. A demonstration garden could be used to show family members, friends and neighbors how to grow additional vegetables and fruits and how to incorporate this produce into the family diet.

Manure, both poultry and cattle, is available for use on family gardens at minimal costs. It is important to use only moderate amounts of chicken manure. Too much results in much vegetative growth and poor yield. Making compost to use as a source of plant nutrients, using green plant materials or residues, manure and soil, also could be demonstrated. A comparison of mulching between rows versus not mulching would show the benefits of a four to six cm. thick mulch layer for controlling weeds, conserving moisture, increasing yield, reducing disease problems and improving the quality of the vegetables produced.

10. Technology 17: Technologies for soil conservation.

The purpose of demonstrating soil conservation technology is to create an awareness that soil erosion is a serious problem which reduces the productivity of soils through the loss of fertile topsoil and, in addition, to demonstrate the technology for reducing soil losses to acceptable levels.

Soil loss which is caused by rapid and excessive flow of rainfall downslope is a serious problem on hillside farms in the Comayagua region. Conservation measures are needed to prevent loss of soil, to conserve moisture and plant nutrients, and to maintain long-term productivity. It is a problem that has been extensively researched worldwide. The results of the research have general application, though need to be adopted to the Honduran system of farming. In addition to the use of soil conservation measures on cropland, surface water management needs to be considered for the land area above that being cultivated. Trees, which are one of the most effective covers for retaining rainfall on sloping land and for prevention of erosion, need to be planted or reestablished on the steep slopes above the tilled fields. They are a valuable resource as well as an excellent rainfall conserving plant cover.

The technologies listed and described below have particular application to the gently, moderately, and steeply sloping land being cropped by farmers.

Contour Planting. Contour planting is the planting of rows on level or slightly sloping contours across or at right angle to the slope of the land. It reduces soil loss by slowing or stopping the flow of rainwater down the slope. Each row serves as a small ridge or dam which impounds or slows the movement of rainwater and thus increases the time for the water to seep into the soil. It is a particularly effective practice on gentle slopes. Though contour planting on steep slopes reduces soil loss, other conservation practices such as strip cropping, terraces, and water management are needed to achieve adequate erosion control.

The first step in contour planting is to mark off level contours across the slope at intervals of 30 to 50 meters. This can be done with a frame or leveling device with a plumb-bob attached to its center apex. It is easily made from materials available on a farm.

The next step is to make the planting rows parallel to the marked contours. The final step is to plant in the rows marked off on the contour. Ridging soil along the rows during weeding or tillage operations increases the capacity of the contoured rows to retain water and the effectiveness of contour planting in controlling erosion.

To convince farmers on the use of contour planting in reducing erosion, a comparison needs to be made with planting made parallel to the slope of the land.

Strip cropping. Fields in sod crops can be strip cropped by alternating row cropping and sod strips on the contour. The width of the sod strips and row crop strips is influenced by steepness of slope, that is, as the percent slope increases, the width of row cropped strip decreases and that of the sod strip increases. The steeper the slope, the closer the spacing.

The strips to be row cropped are marked off on the contour. The land is tilled, rows are plowed or marked off on the contour, and then planted. The sod strips, which are left intact, intercept rainfall and water flow from upslope, slowing its movement and thus increasing the amount of water that percolates into the soil. Strip cropping reduces the length of slope of row cropped land which greatly reduces run-off and soil loss. A modification of strip cropping is to leave a strip of sod between each crop row planted on the contour.

Contour Terracing. Soil erosion increases with steepness of slope, intensity and time period of rainfall, and in length of slope. Contour terraces are used to shorten the length of slope. The spacing between terraces on sloping land decreases as percent slope increases. Because of this fact, terraces are not practical for steep land. Where cropland is scarce, however, steep land or mountain sides may be completely terraced.

Terraces are laid out on the contour or they can be sloped slightly to permit drainage. They are constructed from the soil material adjacent to them on the uphill side. Such construction leaves an embankment and an excavated impoundment or drainage area on the uphill side. Terraces, therefore, store water and serve as drainage ways for excess water.