CTTA: A METHOD FOR TRANSFERRING TECHNOLOGY TO FARMERS

Planning and Implementation Guide

ACADEMY FOR EDUCATIONAL DEVELOPMENT

CTTA: A METHOD FOR TRANSFERRING TECHNOLOGY TO FARMERS

Planning and Implementation Guide

José I. Mata

COMMUNICATION FOR
TECHNOLOGY TRANSFER
IN AGRICULTURE PROJECT

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FOREWORD

COMMUNICATION FOR TECHNOLOGY TRANSFER IN AGRICULTURE, CTTA, IS A BOLD ATTEMPT TO BREAK several time-honored traditions in international agriculture. One is the tradition that agricultural technology is the solution needed to increase yields and improve living conditions for millions of families struggling to survive in developing countries. The second long-held notion challenged by CTTA is that social progress or development comes most quickly and effectively when developing countries copy or adopt agricultural development models from the United States and Europe.

CTTA acknowledges that technology and models are important components of agricultural and rural development. However, it believes they have been disproportionately identified and promoted as the answer.

Instead, CTTA assumes that **use** of technology is the primary issue, not development of technology. CTTA also assumes that technology transfer models can serve to inform and stimulate but cannot be applied as blueprints for success. Rather, in each particular setting, often multiple settings within one country, answers must be found that meet the needs of local people as well as the interests of local and national governments, in order to achieve sustainable progress.

Simply stated, CTTA is about change. No progress can be made in agricultural productivity, for instance, without behavior change on the part of many individuals, groups, organizations and institutions, often acting in concert. CTTA focuses on behavioral change in a very practical and cost-effective way. It works with individuals, groups and organizations to identify the knowledge, attitudes, and practices that exist and those that need to occur for change to result. It looks at incentive systems, rewards, routines, media, feedback loops and other evaluative data. Always, it attempts to build on strengths and reduce barriers. As such,

CTTA does not try to provide the answer. Rather, it seeks to work systematically with existing technologies, policies and economic conditions and use the CTTA process to help indigenous people improve their conditions. The approach is client centered and customer oriented, keeping target beneficiary needs at the hub of all activity. Good technology is good only because the farmer or merchant who uses it seesit that way— and not because the scientist, the extension worker or the minister do.

It seem ironic that specialists in agriculture and rural development have so totally committed themselves to large-scale change and yet pretty much ignore or minimize the importance of the behavioral sciences to achieving that change. To attempt to create massive change with little or no involvement from the disciplines which study and understand it best seems short sighted at best and perhaps even somewhat arrogant. One need only visit any agricultural campus in the United States to learn that education, sociology, anthropology and communication are on the bottom tier of prestige in the discipline pecking order. Important new disciplines and fields such as psychology, market research, and behavior modification are noticeably absent from the mainstream teaching, research, and extension efforts.

CTTA is a multidisciplinary process that introduces behavioral sciences to agricultural and rural development change processes in a manner that is integrative, systematic and cost effective. The CTTA process can be adapted or modified according to local conditions and yet provide a framework for managing the process of change that allows results to be measured and compared across sites. Ironically, because CTTA is multidisciplinary and integrative, it is a low-visibility process, and for some, abstract and too process oriented. This is an unfortunate aspect of a powerful and significant approach for bringing about change in agricultural and rural development. This handbook lays out the process to encourage others to use it, and to gain greater understanding of the importance and function of the behavioral sciences in agricultural and rural development.

Gail McClure
Director,
Communications
W.K. Kellogg Foundation

INTRODUCTION

This Manual presents a communications methodology for agricultural technology transfer having three basic characteristics:

1. *It is a methodology for technology transfer that focuses on the users of the technology: farmers.*

The choice of technology for transfer--or the generation of a new technology--depends on its usefulness as a solution to a problem or production constraint designated as such by farmers. The purpose of modifying a technology prior to transfer is to adjust it so that it will be readily handled by farmers. Throughout the entire process, constant consultation with farmers makes it possible to evaluate both the technology and the strategy for transferring that technology.

2. *Implementation of the methodology requires the coordinated participation of research, extension and communications programs.*

Technology transfer is conceived within a process that begins in response to the needs of farmers and concludes with the adoption and correct application of the appropriate technologies by those farmers.

3. *The methodology formulates transfer strategies in which communications media play a very important role.*

These strategies are used in an integrated and complementary fashion to obtain the greatest possible coverage at low cost to promote adoption and application of the technologies. The strategies are designed based on the nature of the technologies and their users, as well as the resources available to organizations managing the transfer process.

WHO CAN USE THIS MANUAL

The methodology proposed in this Manual should not be viewed as a separate activity within an organization, isolated from existing programs for technology development and transfer, or employing personnel or budgetary resources that are separate from those already at work. What is proposed is a new way of systematizing and refocusing work already underway that allows:

- Researchers to program their activities on the basis of the needs and characteristics of farmers to whom the technologies are targeted;

- Extension agents and communicators to make their activities more timely and better adapted to the characteristics and needs of farmers.

This Manual offers **researchers, extension agents and communicators** a *modus operandi* that can be effective to the extent that they are able to fully collaborate on its implementation.

Since the decision to incorporate these disciplines can be made only by those responsible for their planning, this Manual is aimed primarily at these individuals:

- **Planners of technology development and transfer** at Ministries of Agriculture or organizations dedicated to such activities, and all those responsible for research and extension who have the authority to assemble interdisciplinary teams for conducting work at the regional or local level.

If the methodology proposed here is accepted, the tools for its application can be the same ones currently used by each organization in accordance with its existing resources, but with greater impact.

HOW TO USE THIS MANUAL

The Manual consists of two parts:

1. Part One explains the general process and provides a conceptual framework for the methodology. This section describes each of the steps and how to put

them into practice, providing examples that illustrate their application. The last chapter in the section explains how to establish and sustain the CTTA method in an institution.

2. Part Two presents techniques for conducting an assessment, baseline research, and evaluations, including different ways to collect information.

To planners and directors of programming: for consideration and adoption of the methodology

The overview presented in the first chapter can be useful for planners in agricultural organizations seeking a process or system in which to frame their technology development and transfer efforts. The contents of this chapter should be analyzed and discussed by those institutional staff members responsible for developing and transferring technology with a view to coordinating their efforts.

Whether at the central decision-making level of an organization or at the regional level, those responsible for research, extension and communications programs should read the first chapter of the manual and then analyze it together.

To researchers, extension agents and communicators: for assembling a multidisciplinary technical assistance team

To test the process, the first step is to put together an interdisciplinary team of researchers, extension agents and communicators to work on a pilot project in one zone. Such an application will provide many lessons on how to coordinate the work of the various programs involved.

The interdisciplinary team should be trained in the overall process as well as in the implementation of each of its individual steps. This training should be both theoretical and practical. That is, following the instructions for each step, the team will carry out the corresponding actions directly in the pilot zone.

Training should be provided by personnel who are specialized in each of the individual steps; such as social scientists with experience in assessment or evaluation surveys. If an organization does not have experienced personnel available, the team can develop a process of self-training by dividing the corresponding chapter or chapters into smaller sections. Each section can than be read individually and subsequently analyzed and discussed by the

team. Both a schedule and a fixed timeframe should be established for individual study and group analysis.

Joint study of each step of the process should be followed by implementation of the corresponding task. *For example*, after review of the chapter on the assessment comes the design of the assessment and the survey instrument; once the assessment is completed, the results will serve as the basis for the study and application of the chapter on communications strategy design, and so on.

Certain steps may draw heavily on a particular discipline, although the entire interdisciplinary team will be involved in their implementation. *For example*, for technology adjustment, the prime responsibility resides with the research program, however the other programs also participate in the process. Therefore, the discipline most closely related to the topic will lead the actions involved in that particular step.

If the CTTA process is not accepted in its entirety, it is possible that one or more of the individual steps set forth in this Manual can be of use for a particular program. *For example*, if the idea is to formulate the best communications strategy or to determine which technique is the most appropriate for investigating a particular behavior, the chapters on these subjects can be consulted.

Part one:

Concepts and Methodology

CHAPTER 1

Communication for Technology Transfer in Agriculture: An Overview

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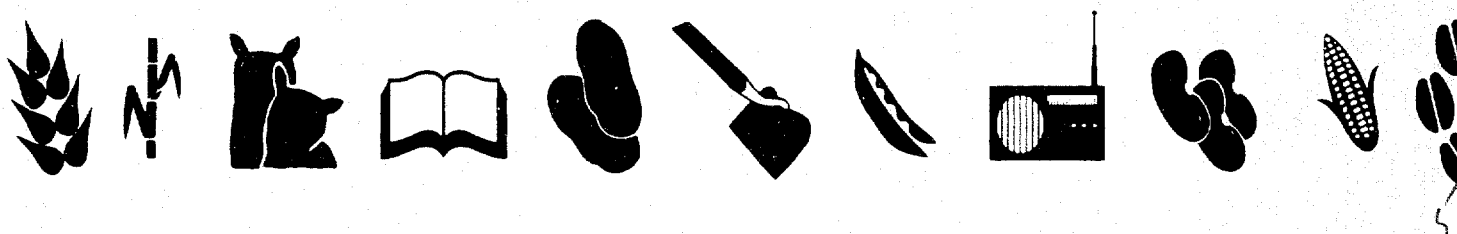


INTRODUCTION

For technology transfer to be effective, communication between the various participants in the process (researchers, extension agents and farmers) is essential. In a word, progress in agriculture depends on a successful communications methodology.

The Academy for Educational Development (AED), a nonprofit organization, has developed and tested, through the **Communication for Technology Transfer in Agriculture** (CTTA) **Project**, financed by the Agency for International Development (A.I.D.), a methodology for adapting and transferring, that is, *communicating*, technologies to farmers. The methodology has been tested and enriched by experiences in four pilot countries-Honduras, Peru, Indonesia and Jordan-as well as by a wide variety of activities carried out throughout the world. This methodology, a generic five-step process, has proven to be highly applicable and adaptable to diverse situations and contexts.

The methodology proposed by CTTA is:

- **Participatory:** Because it includes the views of farmers in the technology development and transfer process.
- **Integrative:** Because it involves researchers, extension agents, communicators and farmers in a continuous, interactive process.
- **Practical:** Because it focuses on immediate problems of the farmers; uses local resources of personnel, equipment and offices; and is low cost.

CTTA combines these factors to develop a strategy and then institutionalize and maintain that strategy over the long term. Government and nongovernment institutions in Honduras and Peru, where this methodology has been tested and applied, have adapted it for use in their extension services. Implementation of the methodology, which generally begins in pilot areas, can be rapidly extended to other areas due to its ease of application.

PILOT AREAS WHERE THE METHODOLOGY HAS BEEN APPLIED

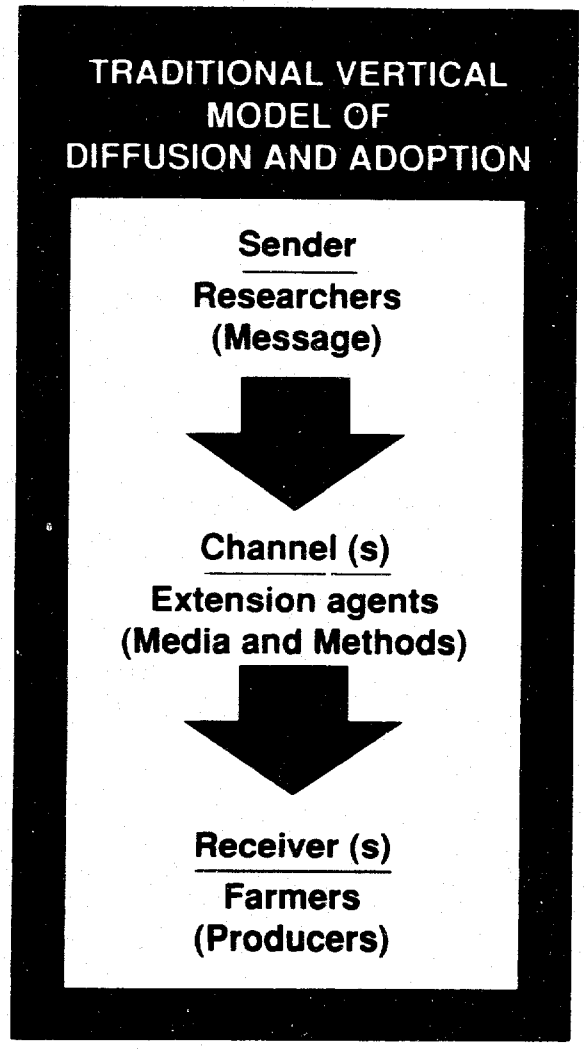
Each site where the CTTA methodology has been tested provided a different setting and set of circumstances, proving its versatility in responding to the particular characteristics of each.

- In **Huaraz, Peru**, the methodology was tested in six communities with a total population of some 4,000 farmers. Daily radio programs broadcast in Quechua and Spanish disseminated technologies for potato, corn and wheat crops. The radio messages, supplemented by the distribution of flyers and graphic learning guides, delivered technologies that were carefully adapted to the conditions and characteristics of the local terrain as well as to the needs and financial constraints of the farmers. Farmer participation in the process and the continuous feedback provided throughout made it possible to strengthen the linkages among research, extension, communications and farming activities. Use of the methodology was later extended to thirteen additional regions of the country, where it continues to be applied successfully.
- In **Comayagua, Honduras**, the CTTA methodology was applied through the regional agricultural communications department and the extension service to increase bean, rice and corn crops and to promote soil conservation practices. A coherent information and communications campaign used a daily radio program, a variety of graphic materials and a network of rural leaders. In addition, many extension agents were trained in communications skills and techniques to facilitate their work. The application of the methodology so strengthened extension activities that extension agents became more enthusiastic about their work and farmers became much more appreciative of their services. Consequently, the methodology played an essential role in influencing the approach used by the extension service nationwide.
- In **Malang, Eastern Java, Indonesia**, the methodology was applied under the Secondary Crop Development Project to introduce new basic crops and farming practices. A number of different materials were used to reach farmers, including colorful calendars on agricultural topics, photonovels, radio programs that

were written and broadcast in local languages and traditional puppet shows.

- In **Jordan**, the methodology was used to train farmers in the safe use of pesticides, essential to the health of both farmer and consumer, and to develop opportunities for marketing vegetables in local and export markets.

ORIGINS OF THE METHODOLOGY



CTTA Project activities began in 1986 and the pilot phase of the project concluded in September 1990. The objective of the project was to design, develop and test in a number of different countries a low-cost communications methodology that would develop broad coverage for the dissemination, adoption and correct application of agricultural technologies among farmers of different backgrounds and characteristics.

The search for a methodology of this type was rooted in the inability of traditional extension methods to effectively transfer technology to large numbers of farmers. The traditional extension model was characterized by a vertical, one-way communications approach featuring research, extension and, finally, the farmer. (*See Figure*)

This one-way communications process biased the model toward technology rather than toward the farmers. Thus, the research service commonly dealt with those problems that it considered relevant to its own interests and not to those of the farmers; often the results were not delivered efficiently to the extension agents who did not have either adequate information or resources necessary to carry out their work. In the traditional model, researchers, extension workers and farmers were viewed as three separate strata and the links between them were weak or, in many cases, nonexistent. Communications programs, in turn, were used independently and often without any coordination with research and extension activities.

The CTTA methodology overcomes these limitations by incorporating the techniques of *social marketing*. Essentially, social marketing draws from commercial marketing, for purposes of developing social benefits, a method that is essentially oriented to the "consumer." This method suggests that consumers "will purchase" only those

that they need or think they need. The communications techniques used to market a product serve to disseminate information or practices having social objectives.

In terms of agricultural technology transfer, farmers will adopt only those technologies that are useful and accessible to them and which they can adapt to their particular situation, characteristics and capabilities.

The CTTA methodology stresses:

- Specifying production problems and constraints;
- Identifying currently available technologies that can offer a solution for such constraints; and
- Adapting the technologies to the actual conditions of farmers prior to designing a communications and extension strategy for transferring those technologies.

Consultation with farmers throughout the process and the use of a multidisciplinary team approach make it possible to test and adapt technologies simultaneously as well as the communications media and instruments that will be needed to transfer them to the farmers.

WHAT IS "AGRICULTURAL TECHNOLOGY"?

CTTA defines "agricultural technology" to be any behavior or practice that corresponds to the interaction of individuals within the particular production system. From the time farmers decide what to plant until they sell their harvest, they perform a series of practices that are the product of what they know and what they think is best. Agricultural professionals-researchers, extension workers, agroeconomists and others-are likewise equipped with certain knowledge that in turn leads them to believe in the effectiveness of particular farm management and marketing practices. Both sets of behaviors or practices-those applied by farmers and those followed by agricultural professionals-constitute agricultural technologies.

AN OVERVIEW OF THE TECHNOLOGY TRANSFER PROCESS

Research programs always seek the most effective technologies possible. But in many cases, effectiveness in solving a problem is not based on the ability of an individual to use the technology to solve the problem.

Often, technologies proposed by research centers are adaptations of technologies from other parts of the world. They may be fine for large, commercial farmers involved in agroexport or agribusiness, but they are generally not workable for the large majority of subsistence, resource-poor farmers.

Too frequently researchers propose only those technologies that they consider to be the "most advanced." They feel that this is what is expected of them and that their professional standing will be affected if they were to suggest less "sophisticated" technologies. Nor are they disposed to recognizing that the traditional technologies and knowledge of farmers have scientific validity. In the opinion of such researchers, rural development efforts should be based on the agricultural development strategies practiced in industrialized countries.

Disregard for former knowledge and traditional management techniques also extends to other areas of the technology transfer process. It is commonplace to see communications materials that are merely translations of materials in use in developed countries or technological compendiums aimed more at Ph.D.s of agronomy than farmers.

To transfer technology in a sustainable manner, it is necessary to change the attitudes and behaviors not only of farmers but also of researchers, extension agents and communicators.

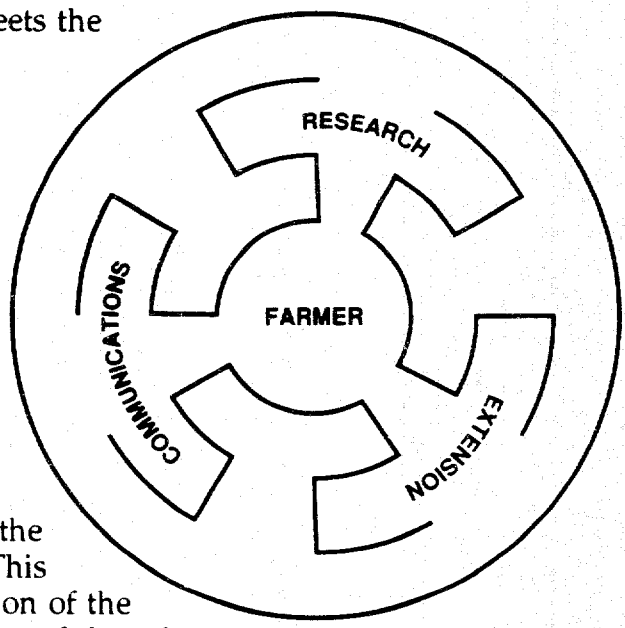
PRINCIPLES OF THE CTTA METHOD

It is important to revisit the three fundamental principles of the CTTA process outlined in the Introduction. These principles grew out of the application of the methodology in several countries and in a variety of settings. We believe they have been shown to be universally applicable.

1. The farmer as center of the methodology

In the eyes of a researcher, a technology may be excellent, but if it is not adopted by the farmer, it only serves to fill file cabinets of scientific journals. In other words, it is the farmer who gives validity to a particular technology by adopting it.

Farmers will adopt a technology only if it meets the following requirements:



- The technology must be useful. This means that it must respond to the farmer's perceived needs or problems.
- The technology must be accessible. This means that the farmer must be able to obtain it using available resources. These resources are not only economic but include time, effort or the capacity to understand and apply the technology.
- The technology must be adaptable to the farmer's overall production system. This means that the adoption and application of the technology must not compete with any of the other elements of the farmer's overall production system.
- The technology must be compatible with the farmer's social and cultural systems and its application must not compete with any deeply rooted beliefs or practices associated with those systems.

Many examples exist in which agricultural technologies that have been discarded because they did not meet these requirements. *For example*:

- Often the same pest control products are recommended to farmers who have the tools to apply them as well as to farmers who do not have the means to purchase the products.
- High-yielding crop varieties promoted by extension service campaigns are not accepted because consumers do not like their flavor, color, appearance, etc. Consequently they are difficult for the farmer to sell.
- Varieties of short-stemmed cereals are unused because they produce insufficient quantities of fodder to feed livestock.

- Methods for planting corn are not accepted by some cultures because the effort required for their application excludes women, who traditionally perform this task.

All of the requirements identified subordinate the quality of the technology to the possibility of adoption by the farmer. To develop technologies than can be adopted by the farmer, it is first necessary to know the farmer's needs, capabilities, production systems and sociocultural characteristics. In other words, investigate the farmer before investigating the technology.

2. Technology transfer as an integrative process

A perfectly appropriate, timely, useful and accessible technology will be of no use if it does not have a systematic and effective dissemination strategy. Sometimes, research, extension and communications efforts act independently of one another; as a result, improved agricultural technologies or behaviors rarely reach the farmer.

Research that does not identify and develop clear insights into the target users runs the risk that its results will be of little use to, inappropriate for or unattainable by those users. If research does not tie in closely with the extension service, the latter may not receive the technologies on a timely basis for subsequent transfer to farmers. As a result, farmers might look to other sources, such as producers and marketers of agricultural inputs, for assistance. If research and extension do not establish appropriate linkages with communications efforts, the technologies will not be broadly disseminated.

Thus, research, extension and communications cannot be viewed as isolated elements. Nor can they operate with their own independent processes or systems. To ensure the adoption of technologies, these disciplines must be integrated into a coherent process within which the function of each is interdependent with, and complementary to, the others.

3. Integrated communications media as the transfer instrument

To deliver technologies to large numbers of farmers and be successful in persuading most of them to adopt and apply such technologies correctly requires the creative formulation

of strategies that combine different types of mass media with interpersonal media, including, among others, radio, group training and graphic materials.

Traditionally, technology transfer has been based on interpersonal contact with farmers. This requires many extension agents and extensive resources that are often unavailable to most organizations. The various communications media, used according to their capacity to deliver technical messages to different farmer groups, offer alternatives that are equally effective and lower in cost.

For communications media to successfully and effectively reach large numbers of farmers, they must be integrated within the framework of strategies that are efficiently designed and managed. These media must respond to the preferences of the target farmers and to their ability to understand the technologies. The selection and formats of such media must first be analyzed on the basis of farmer preferences and complexity of the technology.

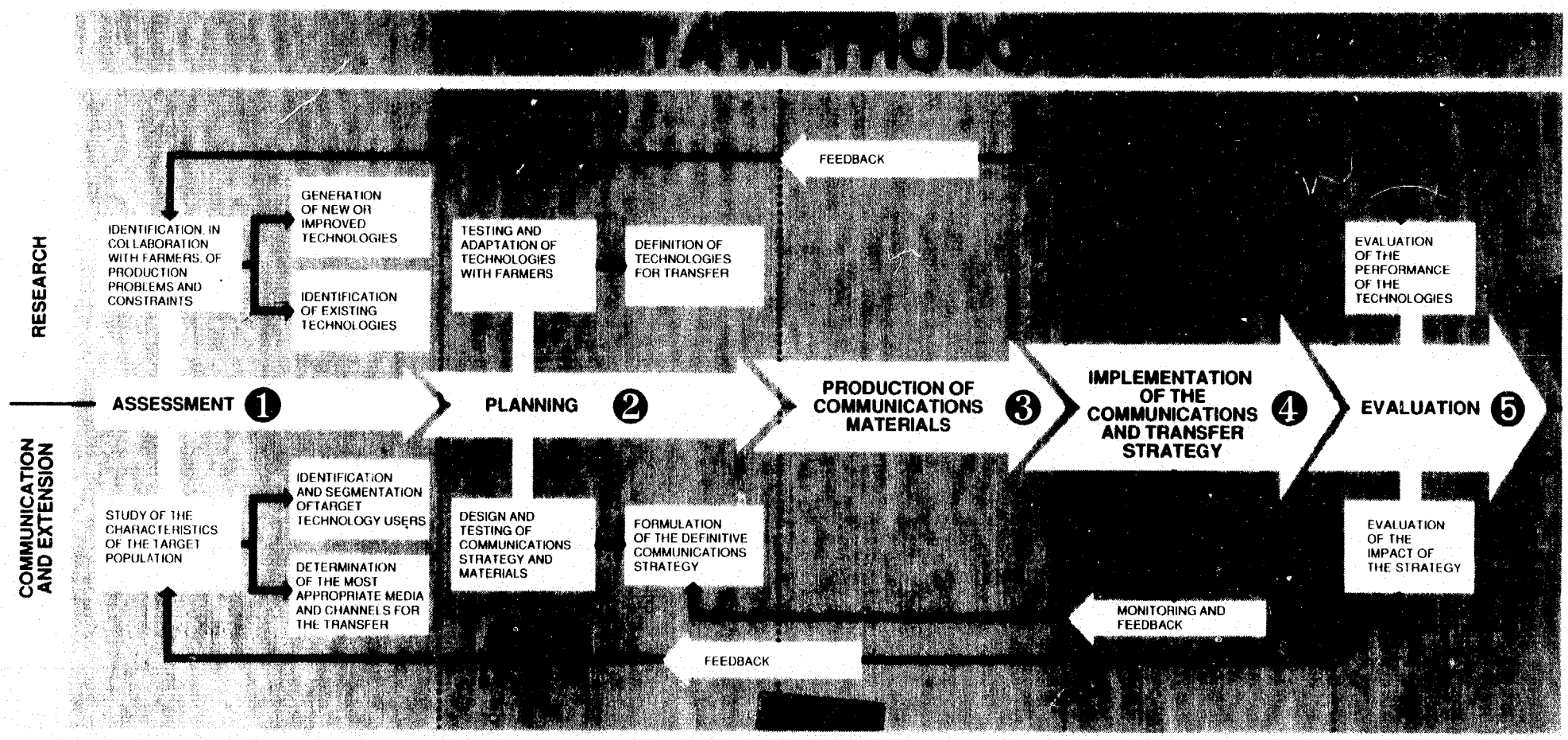
THE CTTA MODEL IN ACTION

The CTTA methodology consists essentially of five steps. The sequence and combination of these steps constitute a systematic and proven method for designing and implementing an effective strategy for agricultural technology transfer. *(See flowchart, next page)*

Step 1: Assessment: the formative investigation of the target population and production systems

The assessment seeks to integrate the views of farmers with those of technicians and researchers in the identification of production problems and constraints to develop or select the technologies that will solve them. An assessment seeks to identify the specific characteristics of farmers, so that both the technologies and the eventual communications and transfer strategy are well designed and specifically suited to the farmers.

As a result of the assessment, existing technologies or technological responses are selected that can assist in solving the particular agricultural problems identified. For those problems lacking an available technical response, the assessment can help to assist in the development of appropriate research plans.


RESEARCH
COMMUNICATION AND EXTENSION
ASSESSMENT 1
PLANNING 2
PRODUCTION OF COMMUNICATIONS MATERIALS 3
IMPLEMENTATION OF THE COMMUNICATIONS AND TRANSFER STRATEGY 4
EVALUATION 5
IDENTIFICATION, IN COLLABORATION WITH FARMERS, OF PRODUCTION PROBLEMS AND CONSTRAINTS
GENERATION OF NEW OR IMPROVED TECHNOLOGIES
IDENTIFICATION OF EXISTING TECHNOLOGIES
TESTING AND ADAPTATION OF TECHNOLOGIES WITH FARMERS
DEFINITION OF TECHNOLOGIES FOR TRANSFER
FEEDBACK
EVALUATION OF THE PERFORMANCE OF THE TECHNOLOGIES
STUDY OF THE CHARACTERISTICS OF THE TARGET POPULATION
IDENTIFICATION AND SEGMENTATION OF TARGET TECHNOLOGY USERS
DETERMINATION OF THE MOST APPROPRIATE MEDIA AND CHANNELS FOR THE TRANSFER
DESIGN AND TESTING OF COMMUNICATIONS STRATEGY AND MATERIALS
FORMULATION OF THE DEFINITIVE COMMUNICATIONS STRATEGY
FEEDBACK
MONITORING AND FEEDBACK
EVALUATION OF THE IMPACT OF THE STRATEGY

Step 2: Planning the transfer strategy: which technologies to transfer and by what means

Selected technologies are then tested and adapted to the characteristics, capabilities and resources of the farmers who will use them. In a parallel action, a communications and transfer strategy is designed based on the results of the assessment.

This step defines segments of farmer populations with similar characteristics so that they can be grouped according to the particular domain for the recommended technologies. This initial definition of users is essential for designing the messages and selecting the media to be used in the strategy.

Step 3: Preparation and testing of communications materials to present the technology

The task of adjusting the technologies, which is carried out largely by extension agents and field researchers, allows communicators to prepare and test the communications materials that will be used to disseminate those technologies once any needed adjustments have been made. These materials are systematically tested and reviewed by members of the target group.

Step 4: Implementation of the transfer strategy through strategically integrated communications media

A strategy is now developed and put into practice; its operation is monitored continuously by means of efficient tracking systems. Since agricultural production is a dynamic and ever-changing process involving multiple stages, the messages should correspond to the specific cultivation cycle of each crop.

Mass media, printed materials and interpersonal training should be integrated and mutually reinforced through dissemination of consistent messages in a manner that is entirely comprehensible to the target farmers. Ongoing training of extension agents, farmers chosen by their peers or communities and communicators in the transfer strategy and its content is central to this step.

Step 5: Evaluation: measuring impact

Monitoring and evaluation are basic components of the CTTA methodology. Monitoring makes it possible to

the performance of each of the components of the program, as well as the results developed among the users.

Evaluation makes it possible to periodically measure the performance of the strategy to make adjustments and to analyze the ultimate impact through quantification of the production results and the changes occurring in the standard of living of the farmers.

KEY FACTORS IN THE SYNTHESIS AND IMPLEMENTATION OF THE STEPS

To summarize, the key to the success of the CTTA methodology is the convergence of direct, continuous consultation with the user of the technology, the collaboration of technicians and communicators and dissemination of the technological information directly to those who can take greatest advantage of it. The key to success involves a combination of the following factors:

- Clear definition of production problems and constraints
- Identification of the users of the technology and their characteristics
- Selection of the technologies that best respond to production constraints and to the farmer's available resources
- Adaptation of the technologies to the characteristics of the users
- Formulation of a communications strategy in which a mix of complementary media disseminate the technology in the most efficient manner and at the most appropriate time
- Adjustment of the strategy and communications materials to suit the characteristics of the users
- Establishment of monitoring and evaluation systems

RESOURCES REQUIRED FOR APPLYING THE CTTA METHODOLOGY

One of the reasons the CTTA methodology was designed and tested was to offer an alternative technology transfer process that would be more economical than traditional extension methods, would have wide-scale coverage or outreach, and would rely primarily on the existing resources of the imple-

menting organizations to sustain it. However, the organizations responsible for the development and transfer of agricultural technologies must have some staff and discretionary funds available to support this process.

In most cases, the problems and obstacles surrounding the effective transfer of technologies have their origins not so much in the scarcity of resources as in the fact that research, extension and communications programs work in an isolated and uncoordinated fashion. Coordination among the three units advocated by CTTA makes it possible to improve the current status of technology development and transfer efforts in various organizations. In most cases, there is no need to create new structures or increase program budgets. The CTTA methodology proposes the *systematization* of technology transfer efforts as a means to improve greater effectiveness and impact.

Human resources and infrastructure

The minimum team of individuals required to apply the methodology consists of the following:

- a person with a background in communications, education or extension who is responsible for the communications activity for technology transfer;
- an educator-communicator whose responsibility it is to translate the technologies to be transferred into educational messages that farmers can understand. This person will be the permanent contact with researchers and other sources of technology development;
- a graphic artist with photography capability;
- a radio producer-scriptwriter;
- a recording technician to handle radio equipment;
- two announcers;
- a printing equipment operator (mimeograph and offset); and
- an administrative assistant.

This team should be trained continuously in the methodology as well as in all aspects of its application.

Interinstitutional resources

In some regions, resources in other organizations can be tapped in implementing the methodology. Universities or

PLACING THE CTTA PROCESS WITHIN THE CONTEXT OF REALITY

In Peru, the CTTA Project only provided funds for personnel to conduct an assessment and develop radio broadcasts. The Instituto de Investigación Agropecuaria y Agroindustrial/INIAA [The Institute for Agricultural and Agroindustrial Research], which was responsible for implementing the Project, had an experimental station in the pilot zone complete with researchers in the principal crops grown in the region, extension workers and a technical communications office with equipment for producing simple graphic materials and radio programs.

Researchers developed their programs based on annual plans. Extension agents used the method known as the training-visit, which only enabled them to cover 18 percent of the population in their areas. Communicators had a weekly radio program that had limited coverage and a small listenership. Moreover, the usefulness of the radio program to farmers had not been evaluated. All too often, extension agents complained of not receiving any technologies to transfer, or of receiving technologies that were too expensive for farmers to use. The communicators independently decided on the content of their radio programs and graphics based on their own experience or adapted from materials from other sources. The messages rarely reflected the actual problems of the farmers or coincided with the cycle pertaining to the principal crops grown in the region.

More than human or material resources, what was lacking was a method to systematize efforts and make them more effective. In the pilot area, the staff worked with corn, potato and wheat crops. The combined agricultural cycles of these crops ranged from June of one year to June of the following year. During the first year the assessment was conducted and the technologies for all three crops were selected and adapted, the strategy was designed for the mass promotion of those technologies during the following set of cycles in the second year. With appropriate technologies to transfer, it was easier to spark the farmers' interest using the communications and extension media traditionally used in the area.

technical institutes offer the possibility of using graduate students to conduct surveys for the assessment or evaluations (after training them). There may be organizations in the area with printing or radio production equipment that would be willing to provide such services in exchange for the cost of materials used.

A review of the potential resources in the region can lead to the signing of interinstitutional agreements, a practical mechanism for effectively bringing about the coordination that development organizations are always seeking.

For further information on the administration of the methodology see Chapter VIII: Institutionalization: Sustaining the Impact.

SOME RESULTS FROM APPLICATION OF THE METHODOLOGY

The CTTA methodology has demonstrated in various countries the viability and impact of a model for agricultural technology transfer based on respect for the views of the users in the design and implementation of all its components. Some results that were achieved at the farmer level as well as the institutional level include:

- **Extension and technology transfer services reached a larger number of farmers.**

In the project area in Honduras, coverage was increased from 2,200 farmers to 32,000 in three years, and in Peru from 4,000 to 21,000 over the same period. In both cases, this increase added very little to the cost.

More than 70 percent of the farmers in the pilot area in Peru listened to the daily broadcast of the radio programs. The audience for the radio programs was so extensive that when the government was no longer able to continue paying the cost of the broadcasts, the radio station provided the space free of charge for a long time to avoid losing such an important rating. The use of certain technologies in some cases increased as much as thirty-fold or more.

In Indonesia, the methodology so successfully demonstrated the benefits of the model in terms of achieving widespread coverage that its operation was transformed into an autonomous unit alongside the research and extension services. The communications strategy included radio programs and mini-dramas, publications, calendars and posters, as well as the traditional puppet shows.

- **Extension services were strengthened**

In Honduras, use of the methodology revitalized the extension service in the pilot area in Comayagua. When the extension workers focused more on the specific problems of

the farmers, they were better able to comprehend the nature of those problems and find more satisfaction and utility in their work. The farmers, in turn, began to value the extension services more highly and to regain confidence in them. In addition, the principles of the methodology were gradually extended to the rest of the country by means of the Unified Service Delivery Methodology of the Government of Honduras's extension program.

In Peru, the methodology was adopted in twelve new regions following substantiation of the results in the pilot area. When the technical assistance provided under the project concluded, the methodology continued to be applied in the thirteen regions by local personnel.

In Jordan, the methodology made it possible to successfully link eight government institutions and agricultural cooperatives, two A.I.D. programs and six mass media groups to disseminate information on the safe use of pesticides.

SOME LESSONS LEARNED

Although the CTTA methodology contains certain basic steps that govern its application, the way in which these steps are implemented in each location or country will vary, depending on the particular circumstances found there. Agricultural conditions, the status of natural resources and agricultural policy differ from one place to the next and such factors influence decisions about what type of technology-transfer strategy can be most effective and most useful for local users. The following observations, which are the result of the experience acquired under the CTTA Project, can facilitate adaptation of the methodology to any context.

1. The limitations to effective technology transfer in many cases originate in the inadequate selection of such technologies, resulting from the lack of coordination among research, extension and communications programs.
2. It is necessary to identify clearly who the future users of the technologies will be and to segment those users appropriately to develop, adapt and transfer the most useful technologies for this group. Knowledge about the users also makes it possible to determine the most appropriate and effective channels for communicating with them.

HOW TO APPLY THE CTTA PROCESS AND "DO IT YOUR OWN WAY"

In Honduras, the CTTA methodology systematized the delivery of technology and extension services through the Unified Service Delivery Methodology. This did not involve additional personnel or resources, but rather training the existing staff in a new way of operating that would made their work more effective and optimized the use of existing resources. Also in Honduras, the Ministry of Natural Resources had a radio program operating in the pilot zone. By focusing the content of the program on technologies that were more useful and more adapted to the realities of the farmers, the program gained a larger audience and greater credibility. The publications and graphics produced by the Ministry for distribution to the farmers became more effective when adapted to the target groups and tested on those groups prior to final production.

3. Researchers, with appropriate feedback on conditions existing in the field, can identify production constraints and develop precise and appropriate solutions to those constraints. Extension agents, with their knowledge of the users and their constant contact with the realities of rural areas, act as conduits for information during the entire process. Communicators provide the instruments for strengthening extension efforts and achieving greater coverage.
4. The social sciences need to be incorporated into the disciplines that develop and transfer technology. It is significant that all of the CTTA field directors who applied the methodology were anthropologists and communicators who increased their knowledge of agronomy by working with technicians and farmers in the field. Likewise, researchers and extension agents must be open to the knowledge and skills provided by the social sciences that will enable them to better understand and interpret the reality that is to be improved.
5. Continuous formal training in the various technologies is fundamentally important for extension agents and all community leaders with any transfer strategy responsibility. In this way, they can provide appropriate technical assistance to the farmers.
6. The methodology should stress a transfer strategy that will integrate a number of different media-both

mass media and interpersonal media-for disseminating information. The communications media and channels must be mutually reinforcing and the actors in the transfer process-extension workers, community leaders-must be supported by the activities of all media.

7. The transfer process should be flexible. The application of a methodology can be fine-tuned gradually as it is implemented and as lessons learned from the field are incorporated.

In summary, the CTTA methodology has been a useful and effective process for reaching increasing numbers of farmers with improved technologies for substantially increasing their crop yields and thus improving their status and their standard of living. The chapters that follow set out the various steps involved in the practical application of this methodology.

CHAPTER SUMMARY

The methodological process developed by the Communication for Technology Transfer in Agriculture (CTTA) Project follows five basic steps:

1. It identifies, in collaboration with the extension agents and researchers, the problems and constraints affecting production to determine the technologies available for solving them. At the same time, it assesses the characteristics of the farmers who are to receive the technologies. With this information, the technologies are adapted to accommodate those characteristics, and the various components of an effective communications strategy for transferring those technologies can be developed.
2. The technologies selected are tested and adapted to the characteristics of the farmers and to their ability to put them into practice properly. At the same time, a communications transfer strategy is designed based on the views and interests of specific segments of farmers, and combines a number of different communications media to achieve broad coverage of the farmers.
3. The communications materials used to implement the strategy, together with the strategy itself, are systematically tested to achieve the following objectives:

- inform the greatest possible number of farmers about the technologies;
- motivate a majority of those farmers to adopt and put the technologies into practice;
- train those farmers who adopt the technologies to properly apply them and achieve the expected results.

4. The strategy is implemented through a number of communications media in an integrated and complementary fashion. The strategy's components are tracked by continuous monitoring, which provides feedback on the effectiveness of the strategy or the need to modify it.
5. The strategy is evaluated periodically to adjust it to the expected objectives. A final evaluation measures the impact achieved.

These five steps have made it possible for CTTA to document exciting achievements in the countries where its methodology was applied. In these countries, extension services were reinforced by the efficient use of communications, and the adoption of new agricultural technologies increased steadily.

CHAPTER II

Step 1
Assessment: Researching and Interpreting the Reality of the Farmer

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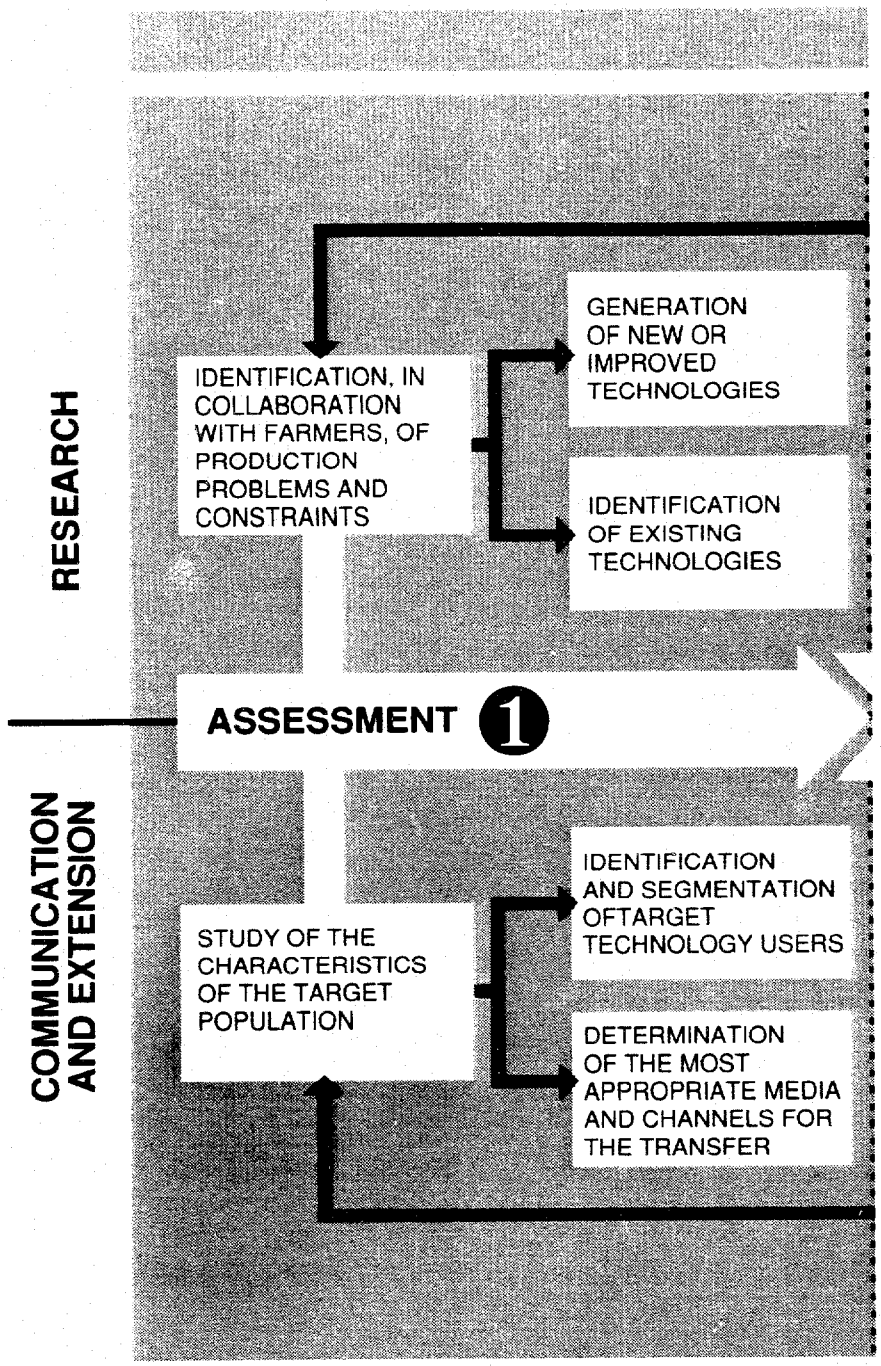
THE CTTA METHODOLOGY



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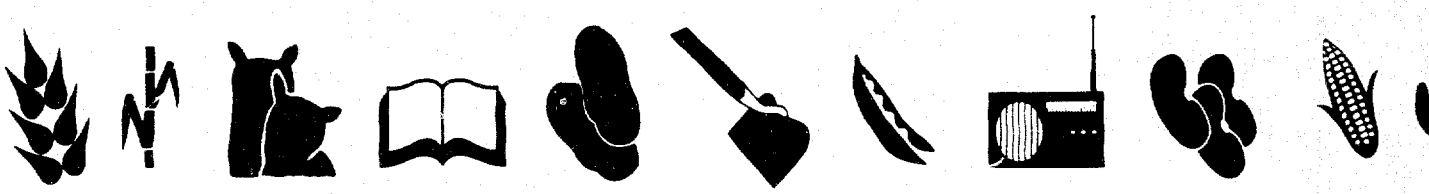


INTRODUCTION

An assessment precedes any plan. However, an assessment is solely a means for designing a plan not an end in itself. When this fact is forgotten, the assessment becomes a long, drawn-out process that exhausts a major portion of project budgets and time.

Occasionally, when an organization hears that an assessment survey is to be conducted, it encounters some resistance. The staff will refer to the many surveys conducted by previous projects and the recommendations that were not put into practice because they arrived when funding was almost exhausted.

Farmers may react similarly when notified that a survey will be done to study their problems. Many development organizations and programs study the rural population to plan their activities. The farmers have explained their problems many times, in rapid surveys or lengthier participatory processes. Since solutions were never forthcoming, they have become weary and distrustful.

When organizations have reservations about assessments based on prior experience, they must be convinced that the assessment proposed by CTTA represents a low-cost and rapid effort that will produce results. The CTTA assessment is a practical, realistic, streamlined research effort, which develops information that can be used immediately to design a communications strategy for technology transfer. It involves quick and efficient consultation with farmers and practitioners to consolidate their views and define their characteristics.

In an area as complex and variable as agriculture, the results of an assessment, however thorough, cannot be considered definitive. Farmers may change their minds about what to plant as a result of a climate change. A drought may lead them to abandon a crop that has already been planted, clear the field once again and plant a crop that does not require as much water. This means that the assessment results, which initially form the basis for the strategy design, have to be updated continuously through monitoring and evaluations.

Monitoring and other feedback mechanisms are the most important tools for ensuring a successful strategy for agricultural technology transfer. In agriculture, there is much uncertainty; program managers must be prepared to take events as they occur and make the corresponding decisions

along the way. The assessment provides the initial orientation, and the subsequent comparison of the baseline assessment with the results of later evaluations indicates the appropriateness of the direction taken.

WHY CTTA CONDUCTS AN ASSESSMENT

Traditionally, technology research and transfer institutions decide which technologies to develop and transfer, and how and when to do so. This has often led to the development of technologies that did not respond to the actual needs or expectations of the farmers.

It is impossible to select the technology to transfer without first having a clear-cut idea of production problems and constraints. Identification of production problems cannot, however, be made unilaterally; it must be done in tandem with the farmers' perspective on their own situation. The technologies to be transferred have to be adapted to the farmers' conditions for the farmers to adopt them as their own.

The assessment is also necessary to identify the media and channels that can be used to deliver the technologies to the farmers in a timely and understandable way so that they can correctly apply those technologies. When a transfer strategy is formulated without taking into account ease of access or farmer preference for particular communications media or channels, the farmers may not be reached adequately.

To summarize, the assessment is necessary to:

- Learn about the farmers and incorporate this information into the decisions made throughout the entire technology development and transfer process.
- Combine the views of the farmers with those of the researchers and extension agents.
- Select those technologies that will be most useful to the farmers.
- Adapt the technologies to the characteristics of the farmers and to their means.
- Disseminate the technologies through the media that are most effective for the users.

Based on the results of the assessment, two fundamental decisions must be made:

1. Which technologies can solve the production problems, and how can those technologies be best adapted to the target population?
2. What is the best way to deliver the technologies and how can they be presented so that they are understood and accepted by the target population?

VARIETY IS NOT FOR VARIETY'S SAKE ALONE

In Peru, one of the problems that frequently appears in extension worker reports is that the farmers plant different varieties of potato in a single field. For a long time, efforts have been made to persuade farmers to improve their varieties of potato through the use of improved seed and by making a single selection for their fields. But some farmers refuse to plant only one variety.

The farmers plant different varieties in the same field to protect themselves against the risks of disease and pests: some varieties are resistant to a particular pest but not to a particular disease, and vice versa. In this way, they lose their entire crop only if it is attacked by all of the pests and all of the diseases. They could be convinced to plant a single variety only if they were given the mechanisms for protecting that variety against pests and diseases, and were assured of a good market demand.

WHAT IS STUDIED IN THE ASSESSMENT

1. Technological problems and factors that constrain production

In identifying production problems, two basic criteria should be taken into consideration:

Seek the causes and not merely the consequences of problems.

Traditional methods of agricultural technology development and transfer begin with the assumption that the technical assistance organizations know the problems affecting agricultural production and already have the solutions. According to this view, the transfer is limited to seeking ways to deliver those solutions to the farmers. When farmers fail to heed these recommendations, all the blame is attributed to their

resistance to change, their inability to understand what is being conveyed to them or their reluctance or lack of interest in improving in their lot.

Traditionally, planning begins with the technical-scientific problems of production, overlooking socioeconomic and cultural factors. Technicians tend to see problems relative to the land and crops, and frequently fail to relate them to the farmer who works that land and those crops. Farmers, however, conceive their production systems in a more integrated manner, and relate their farming not only to the land, but also to their whole way of life. To understand the causes of production problems, it is necessary to study the farmers in greater depth to identify the reasons and motives for their behavior.

The work plans of researchers and extension workers frequently begin with a judgmental definition of the problems, such as "inappropriate seed selection," "inadequate pest control," "poor fertilization." But when they are asked to describe how the farmers perform each task and why they do it that way, they do not know. What they know is what they can see-that the plant has not received sufficient nutrients, that the planting density is too high, that the crop has been attacked by pests and disease. What they do not know is how the farmer manages each phase of the crop cultivation and why he does it that way.

For example, there are cases where fields have been attacked by pests despite the fact that the farmers have used pesticides, even more than necessary. The problem lies in the fact that they have used them improperly and, as a result, the pesticides have not had the desired effect. There are cases of fertilized crops where the fertilizer was applied at the wrong time or in the wrong way so that the crops *appear* unfertilized.

Integrate the views of researchers, extension workers and farmers.

Production problems and constraints cannot be defined solely from the perspective of agricultural professionals or solely from the perspective of the farmer. Both see only one angle of the problem that may be limiting productivity of a certain crop or achievement of the objectives that the farmer set when electing to plant that crop.

If the farmers are asked to identify the problems they experience with their crops, they no doubt will point to those problems that they perceive most directly, such as attacks by

COMBINING PERSPECTIVES

When potato crop specialists in the highlands of Peru are asked to identify production problems, they mention poor-quality seed, poor soil preparation, premature planting, inadequate fertilization, low hill altitude, inadequate pest and disease control and poor storage. When the same question is asked of the farmers, they mention the high cost of fertilizers and pesticides or their inability to control pests and diseases.

In fact, poor preparation of the land and the low hills lead to damage by certain pests; poor seed selection is the cause of many diseases, as is poor storage. When these connections are made for the farmers, they realize there are unperceived problems and then proceed to analyze them.

pests and diseases or the lack of credit and the low market price of their products.

Extension agents, however, perceive a series of negative behaviors in crop management practiced by the farmers, such as inappropriate planting methods for a particular variety of crop or insufficient application of fertilizer. Based on their greater access to information, researchers, in turn, analyze crop management from another scientific perspective and form definitive opinions regarding productivity problems and constraints on that basis.

Only by comparing and considering the views of all those involved in the production process is it possible to identify and define the true dimensions of existing problems.

2. Characteristics of the target farmers

To design an effective communications strategy, it is necessary to begin with a knowledge of the target group. The characteristics of that target group will determine the technological message as well as the appropriate channel and the best format to deliver that message to reach the greatest number of potential users.

To acquire the necessary knowledge about the farmers targeted for technology transfer, and to group them into segments to be targeted in the communications strategy, the assessment should cover the following variables:

Agroecological variables: location and type of land

When it is said that "no two farmers are exactly alike," what is meant is that in addition to the individual farmer's traits, the characteristics of each farmer's lands may be quite different. A particular farmer may even have lands with different characteristics planted with the same crop.

Variables such as whether the land is for dry or irrigated farming, the altitude of the land and whether it is sandy or clay are fundamentally important in determining which technical recommendations to give. A particular problem may manifest itself differently on different lands, and a particular recommendation may produce very different results.

In some places, agricultural organizations have soil classifications available for each region. This makes it easy to recommend in which areas or on what type of lands a particular technology can be applied with the expectation that it will produce good results.

Economic variables: land and resources

An initial segmentation of the farmers in economic terms constitutes a practical step in planning the transfer strategy. Economic variables are an essential factor to consider when adopting new or improved technologies. The risk perceived in adopting a new behavior by a farmer with few resources and little land is greater than the risk perceived by a farmer with sufficient land and resources.

The ability to access agricultural inputs is a determining factor in the adoption of technologies that require such inputs. From a supply of useful technologies, the ones most rapidly adopted are those not requiring any cash outlay.

Technological variables: current agricultural knowledge and practices and level of technology use

The assessment should determine the level of technologies' use by the farmers, the technologies that are currently being promoted, what the farmers think of those technologies and the farmer's capacity to manage new technologies.

As noted in Chapter I, all of the farmers' behaviors with regard to crop management, from the decision about what to plant up to and including the harvest, constitute agricultural technologies.

Agricultural research focused on transfer technology should begin with information on the farmers' management of particular crops and the production system. By analyzing the farmers' technical behaviors, one can determine which of those behaviors should be modified or eliminated, and which new behaviors should be added to ensure more efficient crop management.

By matching the technologies developed by the research centers with the management of the farmers' crop and production systems, it is possible to determine which of these technologies truly respond to needs and what adjustments will have to be made so that they can be managed efficiently by the farmer.

Sociocultural variables: illiteracy, bilingualism, social organization, role division, attitudes and expectations regarding change and risk

Socioeconomic variables establish differences between farmers that then determine, in the strategy design, what types of communications media and formats are most appropriate for delivering the messages and for ensuring that they will be understood.

A knowledge of the prevailing degrees of literacy is of key importance in determining the use of graphic materials and the way in which these materials should present the messages. If there are different languages, a decision must be made about the appropriate language to use to transmit messages or how to combine the languages in the dissemination activities to reach those groups that use them.

The transfer strategy must take into account, and adapt itself according to, the prevailing types of social organization. The structure of a cooperative, association or *campesino* community facilitates forming groups for training. If there are community-owned parcels of land, these may be used as demonstration plots for the new technologies.

Division of labor is a basic variable in the farmers' production system. It is of crucial importance to know how the various members of the family participate in agricultural tasks to properly focus the messages related to those tasks. *For example,* agricultural messages traditionally have been aimed at men, which has no doubt been one of the reasons for the delay in adoption of certain improved behaviors, as many farm tasks are the responsibility of women.

In crop management, *for example,* women tend to do planting, weeding, crop surveillance to prevent attacks by

pests and diseases, harvesting, storage care, food processing and marketing in local markets. In addition, women generally tend livestock, which makes them key in identifying livestock diseases. However, agricultural technology transfer programs often relegate women to secondary activities, such as gardening or small livestock production, disregarding their primary role in agriculture.

Therefore, it is essential to identify very precisely the functions of the various members of the family and of the community as a whole in agricultural activities. In this way, messages can be focused more accurately toward the true target populations.

Awareness of expectations and fears with regard to risk and change is important to better understand a population group. These expectations or fears can be identified by analyzing the results of previous efforts, or by perceiving the interest or lack of interest of the group members in learning new methods, or on the basis of their curiosity to test or use particular agricultural inputs, or their concern for the education of the young people of the community.

Planners of a transfer strategy should recognize that the groups most open to change may be useful for testing and adapting technologies, for testing communications materials and for encouraging, through their own experiences, other groups more reluctant to change. One of the factors that makes a group more resistant to change is the accumulation of frustration from negative experiences with development programs, such as paternalistic approaches that developed dependence and false promises that raised expectations which were then not met.

HOW TO DO THE ASSESSMENT

1. Identification of the crops to be covered

The selection of crops for technology adaptation and transfer depends on two basic factors:

- The agricultural objectives and policies of the country as well as of the particular area to be covered; and
- The function of each crop in the farmer's production system:
  - crops for family consumption;
  - crops for sale at market;
  - crops valued most and worthy of a more technical level of effort.

MAKING INTERESTS COMPATIBLE

In one of the project areas on the North Coast of Peru, farmers were more willing to invest in technology for rice cultivation because of the availability of credit and an assured market. The government, however, wanted to substitute the cultivation of rice in the area because of the scarcity of water. In addition, the rice planting had increased the water's salinity and decreased soil quality. Faced with this situation, project personnel made a decision to introduce the cultivation of hard yellow corn and sorghum. These crops have low water requirements and are resistant to salinization. They benefit from a ready market and the availability of credit. These factors made institutional interests compatible with the interests of the farmers.

Sometimes these factors are complementary; other times they are antagonistic. The ultimate decision on the crop to be covered should take these factors into consideration and ensure that institutional interests are consonant with the interests of the farmers. Otherwise, transfer efforts will not receive a favorable response from the farmers.

2. Who should conduct the assessment

All those involved in the technology development and transfer process participate in the assessment: researchers, extension workers, communicators, farmers. Each group has a role in the assessment and all should join in the analysis of the area to be improved. Since the assessment constitutes the basis for the formulation of a communications strategy for technology transfer, the communicators should coordinate implementation of the assessment.

But not all institutions have an office and properly trained staff available to deal specifically with agricultural communications. In some institutions, technology transfer is the exclusive responsibility of extension programs; others have agroeconomic teams to conduct studies of the farmers. If there is no communications office, create a committee made up of communications, extension and research personnel to be responsible for planning and coordinating the assessment.

3. When to begin the assessment

Planning for the assessment should begin at least three months prior to the date that has been selected to implement the communications strategy for technology transfer. To determine when to begin the assessment and design the timetable, the following factors should be taken into consideration:

- Implementation of the communications strategy should begin at the start of the agricultural cycle to ensure timely dissemination of messages.
- Planning for the assessment, selection of information-gathering techniques, production of the survey instruments and training of the survey personnel takes at least two weeks.
- Information collection and consolidation can take up to one month.
- Analysis of the results and the definitive selection of technologies require at least two weeks.
- Strategy design based on analysis of the survey results will require at least one week.
- Preparation of the initial communications material requires at least one month.
- Build in at least one week to cover contingencies.

(See the sample timetable below.)

4. Information-gathering techniques

In collecting information for the assessment, it is helpful to use a combination of qualitative and quantitative social research techniques.

Some of these techniques are:

- Observation
- Interview
- Focus group
- Survey

Observation serves to analyze agricultural practices and the results produced by those practices.

Interviews with individual farmers, leaders and key informants are useful for gathering and confirming information about basic production problems and access to, and opinions on, technical assistance.

SAMPLE TIMETABLE FOR THE ASSESSMENT

	March Weeks				April Weeks				May Weeks		
	1	2	3	4	1	2	3	4	1	2	3
Review of information available about the area and priority crops	■	■	■	■	■						
First meetings with researchers		■									
First meetings with extension agents			■								
First field visits and meetings with farmers				■							
Formulation of research objectives and selection of techniques					■						
Design of research instruments					■						
Selection and training of surveyors						■					
Testing and adjustment of research instruments						■					
Collection of information in the field							■	■			
Data tabulation, consolidation and processing									■	■	
Analysis of results											■
Second meeting with extension agents											
Second meeting with researchers											

Focus groups are useful for comparing the views of the researchers and extension workers with the views of the farmers on production problems and the technologies that are recommended to overcome those problems.

Surveys are useful for collecting socioeconomic data, documenting the agricultural cycle and establishing levels of

technology use. They also serve to determine access to and preferences for the various communications media.

No single technique is sufficient to cover all of the areas studied in the assessment. Research techniques are selected in accordance with the different types of audiences consulted and the type of variables to be included in the assessment.

An ideal situation would allow a combination of the above-mentioned techniques. *For example,* information gathered by observation can be confirmed in the interviews, expanded on and quantified in the surveys and treated in greater depth in the focus groups. The assessment is based on the integration of results from the various research techniques used.

An explanation of the mechanics of each of the above-mentioned techniques is included in *Chapter IX: Social Research Techniques for Assessment and Evaluations.*

COMMUNICATORS COORDINATE THE ASSESSMENT

At INIAA in Peru, there was an Office of Technical Communications with regional units located throughout the country. In the first three regions, assessments were planned by CTTA Project personnel and the staff of Office of Technical Communications for the region.

Interviews with researchers were conducted by the staff of the Office of Technical Communications and by the CTTA Project personnel. Following the interviews, project staff discussed with the communicators the results of the interviews and analyzed the handling of a particular technology. When the methodology was extended to an additional eight regions, the Technical Communications staff led the planning and implementation of the assessments, seeking help when necessary.

In Honduras, the Ministry of Natural Resources had an Office of Agricultural Communications whose staff was trained in the assessment methodology and charged with its design. When the assessment was later carried out, the extension agents were trained.

The technical communications staff gathered information on the farmers with support from extension workers and reinforcement from enumerators from the local university. The views of the researchers were incorporated into the assessment.

5. Sources of information for the assessment

Information for the assessment can be sought from the following sources:

- Documentation on the area and prior studies dealing with subjects covered in the assessment,
- Farmers who constitute the focal point of the transfer process,
- Researchers from the organizations developing agricultural technologies in the area: experimental stations, universities, private research centers,
- Extension workers or technicians responsible for technology transfer in public and private organizations in the area,
- Merchants or intermediaries to whom the farmers sell their production,
- Vendors of agroinputs,

USEFULNESS OF LOCAL INFORMATION SOURCES

In the pilot zone of Marcará, Peru, one of the richest sources of information turned out to be a merchant whose store was located next to the office of the extension worker assigned to the area. This individual had at one time been the administrator of a large ranch, which, as a result of the agrarian reform process, became the property of one of the *campesino* communities. He had a thorough knowledge not only of many of the members of that particular community but also of many of the characteristics of the farmers in the area. Farmers came to his store from many different communities and, since he spoke Quechua, he learned what was happening everywhere in the zone. He was also a fertilizer salesman for the government agency responsible for marketing this type of input. He knew all about agricultural practices in the area.

The vendor turned out to be a most useful resource for analyzing and substantiating the information gathered. Almost every day, after finishing in the field, CTTA team members would stop by his store and, while quenching their thirst with a soft drink, would discuss with him the information gathered that day. His comments helped to explain many things.

- Loan officers responsible for agricultural credit in the area,
- Political leaders, teachers, clergy and other indirect sources as necessary or as the opportunity arises.

HOW TO GATHER INFORMATION FOR THE ASSESSMENT

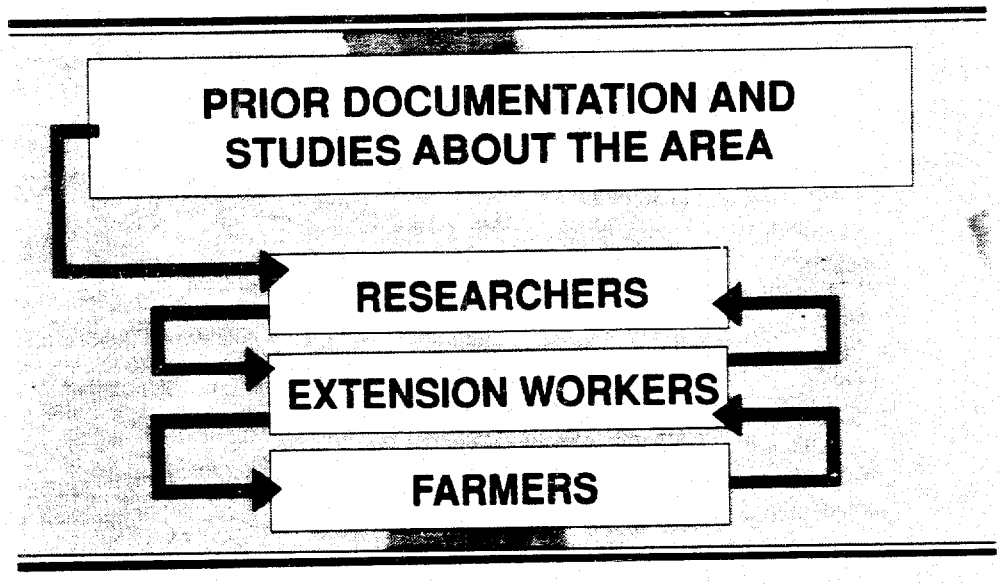
Information is gathered in two stages. The first stage begins with a review of the information available on the area and the crops grown and continues with an identification of production problems and constraints as perceived by the researchers, the extension agents and the farmers. Information gathered from the researchers and extension workers helps focus the research conducted with the farmers. In addition to the farmers' views on production problems and constraints, a study is made of their characteristics, described earlier in the section on variables. All this information is reviewed collaboratively with extension workers and researchers. As information is gathered at each source, it is analyzed and compared to information gathered from the next one. In this way, the information collected at each source feeds back to the information gathered from the preceding one and serves as the basis to focus the search for additional information from the next source. In the second stage a definitive identification is made of the problems and constraints to be addressed and the appropriate technologies for overcoming them, in accordance with the characteristics of the farmers.

The process for gathering information for the assessment is illustrated in the following diagram.

FIRST STAGE OF INFORMATION GATHERING

Information on the area

An initial activity is to review any documentation available on the area. This will give an idea of the characteristics of farming in the area, as well as prevailing economic, social and other factors. Before beginning the actual research, local farmers should be talked to informally to become familiar with the context for the assessment. This will give a frame of reference, together with some general hypotheses to plan and focus the research.



First meeting with the researchers

The process begins with a meeting of the researchers for each crop. The information sought from these researchers is:

- What is the institutional policy on the crop?
- What role does the crop play in the production system of the farmers-family consumption or marketing?
- What are the primary problems affecting production of the crop in the area?
- Which of these problems are related to the way in which the farmers manage the crop?
- What technologies are promoted to address these problems? How is it proposed that the crop be managed?

After analyzing the role played by the crop in the farmers' production system, the assessment team will identify the ideal production rates achieved by the researchers on their experimental plots and compare them to average production rates achieved by the farmers in the area. Reasons for any differences will be analyzed.

Then, the assessment team will define the agricultural timetable suggested by the researchers for the crop. This involves identifying clearly the appropriate seasons of the

year for performing the various tasks involved in managing that crop, from preparation of the land through harvesting.

Within this timetable, team members will determine key times for action to achieve the established production rates. The problems and constraints during these key times that hinder achievement of these rates will be identified, and technical recommendations for addressing those problems will be defined.

In the problem analysis, those variables that involve use of technology must be separated from those that, in the opinion of the specialists, are dependent on the current crop management practices of the farmers. A difficulty often found at this point is that the research programs offer very little help for problems related to farmers' daily crop management. Research programs are concerned primarily with finding new varieties and seeds, or carrying out studies on the behavior of these varieties under differing conditions of fertilization, treatment of diseases and other agroecological factors.

UNACCEPTED TECHNOLOGIES

At the experimental station covering the pilot area in Peru, the response of the researchers to the problems of pests and diseases was to use resistant varieties, primarily hybrids. When a proven variety was identified and extension agents would ask about its availability to respond to an increase in demand, the answer was usually negative. It takes several years to multiply a particular variety to the point where it will produce sufficient seed to justify promoting its use and respond to the demand developed.

In the case of available varieties, resistance was found among the farmers. Only those engaged in large-scale agricultural marketing activities were amenable to using hybrids. Others rejected their use. Their experience had shown that these varieties do not taste the same and do not enjoy the same level of demand in the local consumption market. In addition, as in the case of corn, hybrids cannot be reused for seed, forcing the farmers to invest again in this particular input. Because the farmers are never certain that they will have sufficient money at planting time to purchase seed and may have to forgo planting, they perceived being unable to save their seed, as a significant risk.

First meeting with extension workers

The conclusions reached during the meeting with the researchers should be substantiated by the views of the extension agents who work in the area with the farmers. It is assumed that their direct contact with life in the country affords them greater knowledge of that particular context. It is advisable to hold separate meetings with researchers and extension agents; if joint meetings are held, the extension agents may not dare contradict the researchers and technicians.

The subjects to be included in the meeting with the extension workers are the same as those covered with the researchers:

- Identify ideal production rates in accordance with objectives,
- Compare these rates against the average rates for the area,
- Explain the reasons for any difference,
- Taking into consideration the farmers' own technology, determine the recommendations the extension workers will offer the farmers.

At this point, an additional difficulty is frequently encountered. When there is no well-defined supply of technologies available from the research centers, extension agents select advice according to their own criteria. The validity of this advice depends on the agent's professional competence and the source of the technical information. Each extension agent attending the meeting probably will give different advice for any given problem.

Once the extension workers have presented their views, they should hear the conclusions drawn during the meeting held with the researchers. The extension workers may judge, based on their own experience, the validity of the recommendations formulated by the researchers. Any differing opinions should be resolved by analysis of the differences between the two.

Before proceeding to analyze the views held by the farmers, it is necessary to have, at the very least, a definition developed by the researchers and extension workers of the following:

- Agricultural timetable recommended by the researchers and extension workers for each crop: actions to

SOMETIMES IT'S NOT EASY TO REACH AN AGREEMENT

In the initial meetings with the researchers and extension workers in Huancayo, Peru, it was not possible to reach an agreement on the subject of the disinfection of potato seed prior to planting. For some, failure to disinfect was the primary cause of damage from certain pests, whereas for others it had no real effect on production, as the disinfected seed was protected only during the initial weeks of growth.

The extension workers offered very different recommendations, each according to his or her particular source of information. Some recommendations were considered to be counterproductive and even dangerous. Since it was not possible to reach an agreement, the opinion of the National Potato Program was requested. Potato Program staff responded that seed disinfection was not particularly important.

The farmers had been instructed many times to disinfect their potato seed and some did, despite the fact that it involved an outlay of money and considerable additional effort to properly apply the instructions for disinfection properly. After discussion with the farmers, it became clear that the disinfection of potato seed required considerable output in terms of time, money and effort.

Once all of these issues had been analyzed among the different groups, a decision was made to promote other activities that would provide the same benefit as disinfection. The farmers would be trained to recognize and select healthy seed, and to humidify the seed and place it in the shade a few days prior to planting so that it would turn green and not be as prone to attacks by soil-borne pests.

be taken for management of the crop carefully listed, together with an indication of when they should occur, from preparation of the land through harvest time,

- Primary problems in the production of each crop and points during the agricultural timetable when such problems occur,
- Variable factors in those problems having to do with the farmer's management practices at those times during the cycle,
- Technical recommendations for overall management of the crop, as well as for each specific problem in crop management.

This information will serve as the basis for research activities with farmers and for decisions about which key areas require more in-depth attention.

Gathering information from the farmers

Before collecting field information, the following preparations should be made:

- Those responsible for the assessment, together with the extension worker assigned to the area, should visit the authorities of each town or community to explain the research activity, its objectives and the dates on which it will be carried out.

COMMUNICATING IN THE SAME LANGUAGE

For assessments conducted in the highlands of Peru, communication with the farmers was always in their language, either Quechua or Aymara, despite the fact that almost of all the farmers speak Spanish. Institutional personnel who spoke the native language were used as interviewers. When interviewers were contracted from outside the institution, native language fluency was a basic requirement.

Farmers were pleasantly surprised to hear themselves addressed in their own language. This ensured that they had a better understanding of, and greater confidence in, the interviewer, and they felt more confident when expressing their views.

As neither of the two languages is written, the interviewers carried guides in Spanish about each technique and then translated questions during the conversations. The farmers' answers were recorded directly on the forms, in Spanish.

The use of native languages also helped to build a glossary of terms used by the farmer in referring to production activities and tools. An interviewer who speaks the native language but is not directly involved in the agricultural activities of the *campesinos* will not necessarily be familiar with all the words used in their work. This was always a problem in preparing radio programs. Those agronomists who spoke Quechua had learned everything they knew about agriculture in Spanish.

- A personal credential should be prepared for each interviewer. This credential should indicate the interviewer's name and function and should be signed by the director of the sponsoring organization or by the highest agricultural authority in the region.
- Steps should be taken to ensure efficient logistical operations, assigning responsibilities for procuring transportation and fuel.

To the extent possible, all communications with farmers during the assessment phase should be conducted in their own language. This allows the farmers to express themselves completely and to better understand those aspects of their activities that are being analyzed. If the language spoken in the area is the same as that spoken in the rest of the country, the interviewers should use easily understood expressions and refer to each item by the same names and terms used by the farmers.

In gathering information from the farmers, it is important not only to compare it with information collected from researchers and extension workers, but also to learn about socio-economic and cultural variables that make it possible to segment groups of farmers.

In open-ended research techniques, such as interviews and focus groups, the information gathered from the researchers and extension workers should be presented, and farmers asked for their opinions. The analysis of one problem may lead to other, related problems. *For example,* the interviewers mention the connection that the researchers see between a particular pest and the preparation of the land, and then proceed to analyze the way the farmers prepare their land and why they do it that way.

Open-ended questions should also be used to analyze, with the farmers, the following:

- technical recommendations that they have been given;
- ease or difficulty of putting them into practice; and
- results obtained from their use.

For those recommendations requiring the use of inputs, investigate whether or not the farmers have access to such inputs.

Consultation with other sources of information

In addition to the farmers themselves, there are other sources for gathering or confirming important information, such as:

- vendors of agroinputs in the area, who can confirm production problems and the level of use and availability of inputs;
- merchants in local markets who purchase the farmers' production, and who can provide information on production rates, production problems and crop management; and
- local radio stations that can provide guidance on audience preferences based on their pricing of broadcast time. (They can also be approached for Project use of radio program production facilities.)

ANALYSIS OF THE RESULTS OF THE FIRST STAGE

In this process, all information gathered from one group should be analyzed by the next group in a continuous process of feedback. Then the information gathered from all of the groups should be synthesized.

For this synthesis, it is useful to use the TABLE OF AGRICULTURAL PRACTICES that follows. This table helps to order the information systematically to design and manage the transfer strategy.

The table should be used for the key stages in the cultivation cycle of each crop selected-planting, fertilization, irrigation. After the first assessment stage, it should be possible to fill in the first four columns of the table (represented by the following sequential numbers):

1. Current farmer practices

This first column should contain the most detailed description possible of the actions performed by the farmers during a particular stage of the crop cycle. This description should be a standardized generalization of behaviors. *For example,* in planting: when does planting actually take place; how are seeds selected; how are furrows made; how are the seeds placed; density of planting; whether the farmer fertilizes at this point or not, and if so, how.

TABLE OF AGRICULTURAL PRACTICES

CROP: _____ ACTIVITY: _____

1	2	3	4	5	6	7	8	9	10
Current Farmer Practices	Reasons for Current Practices	Benefits Perceived from Current Practices	Cost of Current Practices	Problems Represented by Current Practices	New Proposed Practices	Reasons for Proposed Practices	Benefits Offered by New Practices	Cost of New Proposed Practices	Intermediate Behavior Alternative

TABLE OF AGRICULTURAL PRACTICES

EXAMPLE SHOWING CORN FERTILIZATION BY FARMERS OF MARCARA, PERU - ANCASH

1	2	3	4	5	6	7	8	9	10
Current Farmer Practices	**Reasons for Current Practices**	**Benefits Perceived from Current Practices**	**Cost of Current Practices**	**Problems Represented by Current Practices**	**New Proposed Practices**	**Reasons for Proposed Practices**	**Benefits Offered by New Practices**	**Cost of New Proposed Practices**	**Intermediate Behavior Alternative**
Farmers apply a dose of urea at time of planting but do not apply the other nutrients	Farmers attribute to the urea properties for proper germination and growth of the plant, but are unaware of the role played by the other nutrients in the formation of the stalk and ears	With the urea, the plants produce generous foliage, giving the impression that they are strong and healthy	Less is spent on fertilizers. The time and effort expended is almost the same, whether one fertilizer or all are applied	The lack of phosphorus and potassium leads to small ears of corn having a lower market value	At the time of planting, apply half of the total recommended dose of urea together with the total recommended dose of phosphorus and potassium	The plant needs the three nutrients to ensure proper growth of the stalk and filling out of the ears. Urea does not make the plant produce large, full ears by itself	Larger ears of corn and stronger stalk, which does not easily break or bend	The farmers need to mix the three types of fertilizer before applying them	Put livestock out to pasture on the non fallow land in order to accumulate their manure and incorporate it into the soil when preparing the land
	The high cost of fertilizers leads the farmer to use a single fertilizer and to choose the one most trusted			Excessive urea can burn the roots and weaken the plant		Phosphorus and potassium should be applied at planting, since they are absorbed more slowly			Concentrate the livestock in a single location at night in order to accumulate manure Bury the manure with foliage and waste from previous crops
Many of those who fertilize twice apply urea during the second fertilization, to the hill next to the plant	This is the way they have learned to do it			When growing, the roots of the plant move away from the fertilizer, so it does not have the desired effect	Apply a handful of fertilizer at mid-point in the space between two plants, burying it along the side of the furrow	The roots extend horizontally and can take better advantage of the fertilizer		It is necessary to make a hole with the *lampa* to deposit the handful of urea	If it is not possible to bury the manure, gather it all together in the same place and cover it with straw and empty fertilizer sacks
In order to apply the urea to the hill at the base of the plant, the farmer places little piles of fertilizer next to each plant until the entire field has been covered. Then the farmer goes back and hills up the furrows	They feel that this makes their work easier	Ease with which a single individual is able to perform the entire task when it is subdivided in this way		When nitrogen has been exposed to the air for some time, it easily becomes volatile and loses some of its effectiveness	Bury the handful of urea immediately	The urea loses its effectiveness when exposed to the air, just as the nitrogen becomes volatile			Occasionally mix the waste piled together or buried, and apply a portion of it when going over the field to turn the soil Save a portion for the harvest and use it instead of the urea ie using the money earmarked for urea to purchase other fertilizers
On the day following the second fertilization they irrigate	They are unaware of the effect that water has on the absorption and distribution of fertilizer	Represents less effort than doing it all on the same day	It requires an extra day's work	It takes longer for the urea to be absorbed by the roots	Irrigate the same day that the hilling is done, soaking the land	Urea is diluted in water in order for it to reach the roots and be absorbed. Heavy irrigation favors rooting	The plants grow strong and straight and do not bent in the wind. Cultivation does not harm the deep roots	All work has to be done at the same time, requiring two people, and finished in order to irrigate the next day	If any is left over, it should be used during the hilling as a substitute for urea. If not enough is left, make up the missing amount with urea

This description should be objective, with no value judgements placed on what is being described. *For example,* for planting potatoes, the description might be as follows:

1. On one side of the field, the farmer prepares piles of seeds, ranging in size from a small stone to a chicken egg. The seeds are different varieties, primarily "Teresa Condemaita" and "Revolución."
2. A woman proceeds to clean the seeds and remove the stolons. The stolons are referred to as "the potato's little children".
3. A man cuts the furrows with a team of oxen. The depth of the plow cut is approximately 10 cm.
4. Behind the oxen, a woman places the seeds, one by one, in the furrow, one pace (approximately 50 cm.) apart.
5. Behind her, another woman places a handful of organic fertilizer over the seed (dry, pulverized cow manure).
6. The team of oxen, on its return pass to cut a new furrow, covers the seed.

From careful analysis of this description, a researcher can draw conclusions as to whether the size of the seeds is appropriate, whether the depth of the plow cut is sufficient, whether the distance between seeds is appropriate for the seed varieties used and other related observations.

2. Reasons for current practices

Every step the farmers take, has a reason. The assessment seeks to discover these reasons. With understanding of the reasons, it is easier to modify any current practices that are not beneficial.

For example, continuing with the example of the potato seed, the reasons for the practices used can be described as follows, corresponding to each of the steps described above under "current farmer practices":

1. The potatoes are classified by the farmers, according to their size and quality as being "first," "second," "third" and "fourth" category. First- and second-category potatoes are set aside to be marketed, the third category potato is used for seed and the fourth type is for family consumption. The size of each type

varies with the quality of the harvest, since the largest in size becomes the "first" category. Seed is selected from third-category potatoes that show no visible signs of pests and diseases.

2. Some farmers believe that the stolons are useless and that the potato has wasted part of its germinating capability. Others believe that a potato with many long stolons exhibits its excellent germinating properties, and is preferred for seed.
3. The type of plow used and the claylike consistency of the soil make a deeper plow cut impossible to achieve. The farmers believe that this depth is sufficient for the size of seed they use.
4. They have always done it this way. The woman plants the seed because she is fertile; if she has borne children, so much the better. They always use this same planting distance, regardless of the seed variety.
5. Covering the seed with a handful of fertilizer has two purposes for the farmers: it nourishes the seed and gives it heat, protecting it against night freezes.
6. They have always done it this way. They do not consider the possibility that a seed may be improperly covered and thus wasted.

3. Benefits perceived from current practices

Farmers repeat a particular technique over time because it has some advantage or benefit for the crop or for themselves. These advantages or benefits need to be identified because any new proposal has to compete with them.

For example, in the case of traditional potato planting, the perceived benefits from each step of the "current farmer practices" are:

1. Small-size seeds are used and the rest are sold.
2. The stolons removed from the seed are cooked and eaten because of their soft consistency.

3,4,5,6. This planting procedure requires little effort and can be carried out by the entire family in a few hours.

4. Cost of current practices

Just as a certain practice may represent a benefit, it likewise represents a "cost." This cost or "price" may be expressed in

terms of effort, labor, time or inputs. The cost or price of the proposed new behavior will have to compete with the cost that the current behavior represents for the farmer.

For example, the techniques described in the preceding examples have the following costs.

- 150 kilograms of seed for one *yugada* (a local measure of land)
- 100 kilograms of organic fertilizer for one *yugada*
- Use of a team of oxen for one-half day
- Five members of the family working on the planting
- One half-day of labor to plant one *yugada*

SECOND STAGE OF INFORMATION GATHERING

In the second stage of the assessment, the first four columns of the table are analyzed by the extension workers and researchers. The extension workers will confirm and supplement the information gathered from the farmers. The researchers will analyze the results to determine which problems, not perceived by the farmers, may be the result of current crop management practices. With knowledge of the expectations and characteristics of the farmers, the researchers can select new technologies to be offered to the farmers to improve crop management.

The problems and responses are defined and placed in priority order. The task now becomes one of seeking information with which to fill in the following five columns in the table.

Second meeting with extension workers

The extension workers analyze and supplement the information provided by the farmers, as follows:

- The agricultural calendar followed by the farmers is noted and the differences between that calendar and the one recommended by the researchers are analyzed.
- The problems described by the farmers are presented, together with their views about the reasons for the problems that the researchers identified at the outset. All of the problems identified so far are examined.
- The reactions of the farmers to recommended technologies are studied for likely acceptance or rejection.

Second meeting with researchers

The researchers are informed about the views of the farmers on each production problem and are briefed on the extension workers' analysis of those views.

- The first item examined is the agricultural calendar that the farmers follow. The differences between that calendar and the one proposed by the researchers are analyzed to determine how these differences affect final production results.
- Next, the farmers' and extension agents' views regarding each problem are described and analyzed, one by one.
- The farmers' views on the proposed technologies are discussed.

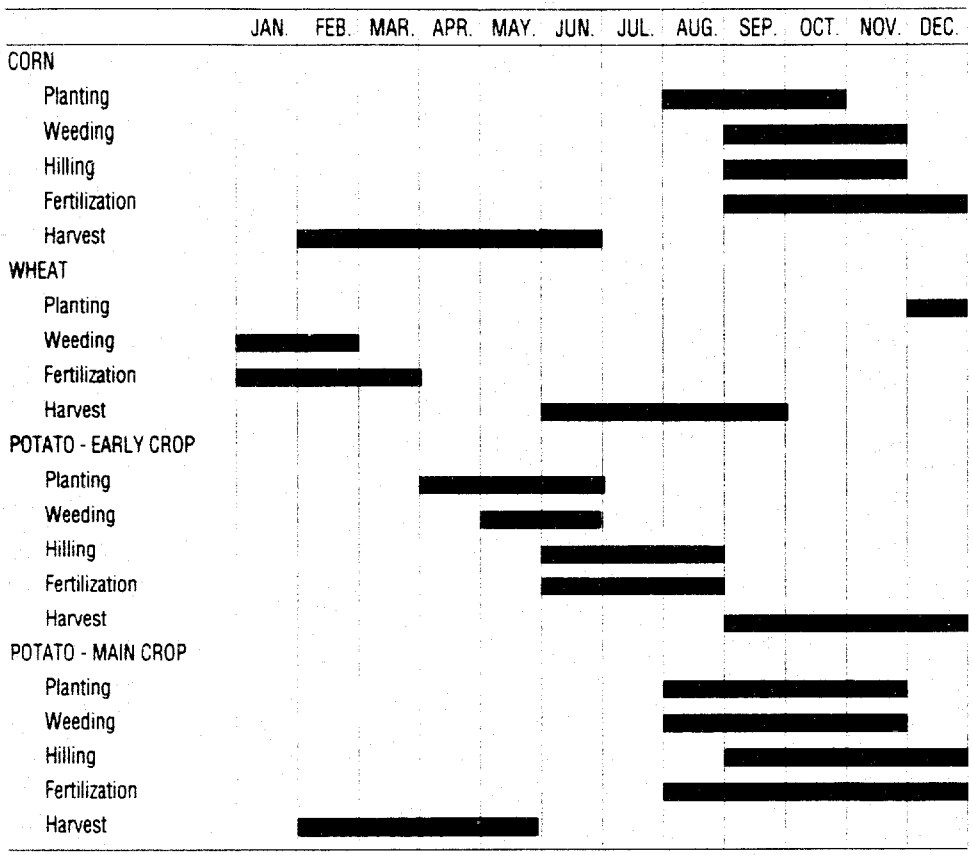
The second round of analysis with the researchers will result in the following findings:

- Specific production problems and the way in which they affect each farmer segment,
- The order, in successive stages, of the problems on which the technology transfer will focus,
- A definitive agricultural calendar that will be used to implement the strategy. This calendar should be based on the one used by the farmers. Whenever the calendars proposed by the researchers do not agree with those used by the farmers, and to the extent that this difference affects production, the difference will be considered to be a "problem not perceived by the farmers." The changes made to the farmers' calendar will then be considered to be *new technologies (behaviors)* that will need to be transferred. (*See the calendar example from Marcará.*)
- The technologies to be adapted to address the priority problems of each farmer segment.

For each point on the agricultural calendar at which a problem occurs, a solution to the problem must be found to propose to the farmers. *For example,* for planting, what is the proper way to plant? How far apart should the seeds be planted? How many seeds should be planted at a time?

If a proposal will require the use of an input, its availability and the farmer's access to it must be ascertained. When the input is not easily available, intermediate measures

AGRICULTURAL CALENDAR FOR THE AREA OF MARCARÁ



that are more practical, although not as effective as the input recommended, must be sought.

When the new practice requires the use of a tool or input that, as determined by the assessment, is not commonly used in the area, an alternative should be proposed. The interviewers can help, based on their talks with the farmers.

One of the most common problems is the tendency of some researchers to offer "ideal" solutions that are not *practical* for farmers. These researchers do not wish to espouse intermediate solutions for fear of appearing out of date or having insufficient scientific training. They need to be reminded that the whole idea is to provide solutions to farmers' problems, and that a very technical or very expensive recommendation will be of no use if it cannot be implemented.

To define the technologies to be transferred, the researchers must be asked to describe, step by step, the management of each stage of a crop's cultivation. (*See the sample dialogue in the box below.*)

Because of their training, researchers describe technologies in terms of "formulas" or prescriptions, rather than in terms of new behaviors to be put into practice by individuals with specific habits and customs. To facilitate definition of the technologies to be transferred, it is very useful when questioning the researcher, for the questioner to act the role of the farmer. The contact with the target audience of farmers in the first stage of information collection will be useful at this stage.

The researchers are asked to explain their technical recommendations in complete detail and to carefully and sequentially break down all steps required to clearly convey those recommendations to someone who knows nothing about farming. The interviewers should not overlook any detail and should draw out the most concrete description possible.

As seen in the example, what started off as a recommendation for "preparing the land and then planting" turned into a sequence pointing to the need to:

1. prepare the land;
2. let the land lie idle for two or three weeks prior to furrowing, and
3. furrow and plant.

Nothing should be taken for granted. Sometimes unspoken assumptions leave gaps and the farmers are unable to make sense of the sequence, or they fail to implement a truly important step.

ANALYSIS OF THE RESULTS OF THE SECOND STAGE

Based on the analysis of the results of the second stage, those present at the meeting will have a clearer definition of the problems affecting production and the characteristics of the farmers. Now, a communications strategy can be formulated for the recommendations to be disseminated and technologies transferred.

The information obtained during the second stage should suffice to fill in the last five columns of the table (represented by the following sequential numbers). (*See the Table of Agricultural Practices.*)

DIALOGUE BETWEEN A RESEARCHER AND A COMMUNICATOR

Interviewer/ Communicator: Well, we have seen how the land must be prepared given the fact that they do not have very many oxen. What is the next step?

Researcher: The next step is to plant.

Interviewer: Directly...? On the soil that has been turned?

Researcher: Not directly. Naturally, they first have to cut the furrows.

Interviewer: So they prepare the field as described, and then they cut furrows and plant?

Researcher: Yes, but it's advisable to leave the field idle for a time between preparation and furrowing.

Interviewer: How much time is advisable?

Researcher: Well... that depends on several factors....

Interviewer: On what factors?

Researcher: On the type of pests that attacked the previous crop.

Interviewer: I don't really understand what you are saying. What does the previous crop have to do with the time that should elapse between furrowing and planting?

Researcher: Well, if, for example, the farmer planted corn before and now wants to plant potatoes, or vice versa, and there were problems with worms and stem borers, the larvae of those worms are still present in the soil. Those same pests will surely reappear if they are not eliminated before planting. The problem becomes even worse when the farmer plants the same crop several times in a row. That's why it's advisable to let as much time go by as possible so that the cold weather and birds will eliminate the larvae.

Interviewer: How much time would be advisable if the farmer planted potatoes, had problems with pests, and now plans to plant potatoes again...? The farmers here plant the same crop in the same soil.

The discussion on how to furrow and how to plant continues.

5. Problems represented by current practices

The researchers will analyze the current behavior of the farmers to identify any problems that those behaviors may be causing.

Identifying problems must begin with a clear sequence of behavioral steps related to the problems, *for example,*

When describing the way in which the farmers prepare the land, the following sequence is developed:

1. Three days before planting, the farmers prepare the land,
2. First they thoroughly irrigate the field,
3. To turn the soil, they go over it twice with the team of oxen,
4. They pile up weeds and the remains of previous crops and burn them on the field,
5. They add the ashes to the soil.

The description of the problems should refer to the sequence, as follows:

- Leaving little time between preparing the land and planting prevents the natural control of pests,
- Two passes to turn the soil is not sufficient for proper germination,
- Burning the weeds on the field, on top of moist soil, hardens the soil around the fire, making germination more difficult in those areas,
- If the soil is alkaline, the additional lime from the ashes upsets the acid balance of the soil.

The same format should be followed for each step of crop management.

6. Proposed practices

At this juncture, the technologies selected for technical reasons are modified to accommodate the variable characteristics of the farmers, who have been segmented for purposes of the transfer strategy.

This means that the proposed technologies should be realistically applicable by the target farmers. In addition, different responses to the same problem can be proposed,

depending on the type of farmer. This should also be presented sequentially on the table, step by step.

For example, taking the preceding example on preparing the land, the proposed new practice is described as follows:

1. The land should be prepared at least two weeks prior to planting,
2. First, the field should be thoroughly irrigated or, alternatively, the land should be prepared following a heavy rainfall,
3. At least three passes should be made over the field to turn the soil, first horizontally, then crosswise, and then once more horizontally,
4. The weeds should be removed from the field and burned to prevent them from germinating again. The ashes can be spread over the field if the soil is acidic,
5. The remains of the preceding harvest can be left in the field, without burning,
6. After the land has been prepared, it is advisable to irrigate once more before furrowing for planting.

7. Rationale for the new practices

The new practices should be fully justified and the technical grounds for them provided.

For example, the reasons for the proposed changes in preparing the land are as follows:

- By resting the turned soil for a period of two weeks, night freezes and birds will eliminate pests remaining in the field from preceding crops,
- Making three passes will soften the earth, mix it well, expose the larvae of pests to the air and aerate the soil so that it will better absorb irrigation. Land that has been properly turned promotes germination of the seeds and sprouting of the plants,
- Burning weeds outside the field prevents their seeds from regerminating in the field; the earth will not be damaged by the heat, which, in addition to hardening the earth, destroys beneficial microorganisms,
- The refuse from the preceding crop is added to the soil so that as it decays it enriches the soil,
- An additional irrigation will soak the earth thoroughly and facilitate its preparation.

8. Benefits from the new practices

In the same way that current farming practices are perceived to have benefits, the proposed ones should carry apparent benefits, such as stronger and more uniform germination or a less severe attack by pests.

For example, the benefits of the method proposed for preparing the land might be described as follows:

- lower incidence of pests and diseases;
- better and more uniform germination and sprouting of plants; and
- greater enrichment of the soil from the preceding crop's organic material.

9. Cost of the new practices

The new methods also have a "price," in terms of time, effort, use of inputs or outlay of cash. This price should be well defined, as it may be a constraining factor for adoption by the farmers and will require making adjustments to the new behaviors.

For example, the cost of the method proposed for preparing the land is:

- one additional half-day of work for the team of oxen, and
- the added effort to remove the weeds from the field and pile them up.

PRODUCTS OF THE ASSESSMENT

On finishing the assessment, researchers, extension agents and communicators should have:

- a clear picture of the basic production problems found in the target crops;
- a good understanding of the characteristics of the farmers and of the way in which they manage their crops;
- an inventory of the available technologies to resolve production problems; and

- a list of the potential media and channels for delivering information effectively to the greatest number of users.

With this information in hand, planning can begin for the communications strategy for technology transfer and for future evaluation instruments.

CHAPTER SUMMARY

The assessment process integrates the views of farmers, extension workers and researchers to identify production problems and constraints. In addition, an assessment looks at the characteristics of target groups of farmers to design an efficient strategy for delivering appropriate technologies to those farmers.

The process of identifying production problems and constraints substantiates information from researchers, extension workers and farmers. The information from these three sources determines which technical or behavioral solutions are appropriate for the problems identified, as well as the way in which they can be adapted to the characteristics and thinking of farmers.

The assessment provides information on the following:

- how the farmers manage their crops;
- the reasons they manage their crops in that way;
- the results they expect from each practice;
- the costs in terms of time, effort and money; and
- the benefits obtained.

By analyzing this assessment information together, researchers, extension agents and communicators are able to identify:

- production constraints caused by current crop management practices;
- technologies or behaviors that can improve current crop management;
- rationale for using new technologies and behaviors;
- results to be obtained with the new technologies; and
- costs incurred from their use.

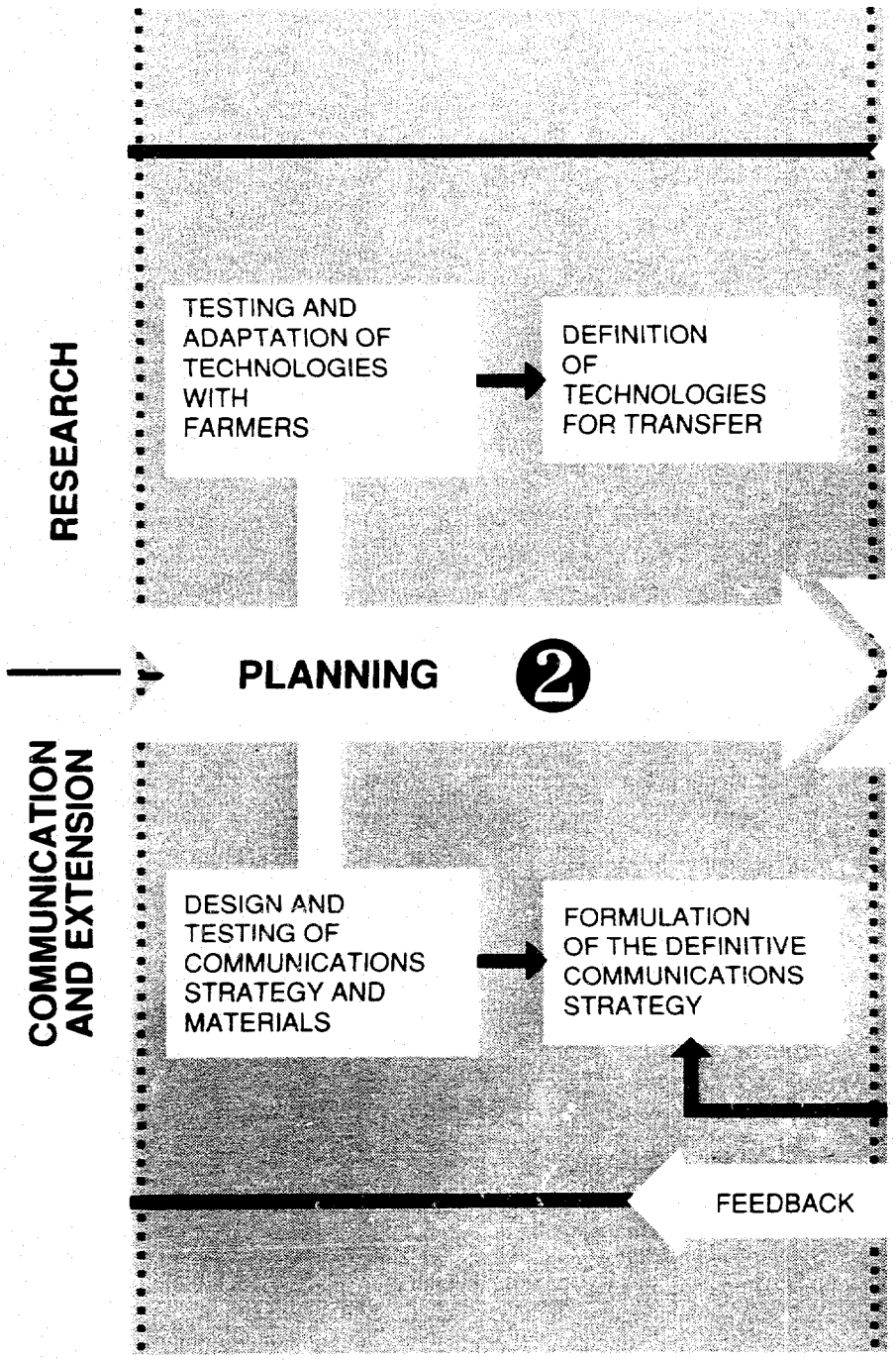
The assessment uses quantitative and qualitative research techniques, including observation, surveys, interviews and focus groups with representative samples of

farmers. The results from the assessment provide baseline information for substantiating and evaluating changes in the agricultural practices of the target population.

CHAPTER III

Step 2.1
Testing and Adaptation of Technologies: Eliminating Obstacles Creatively

THE CTTA METHODOLOGY



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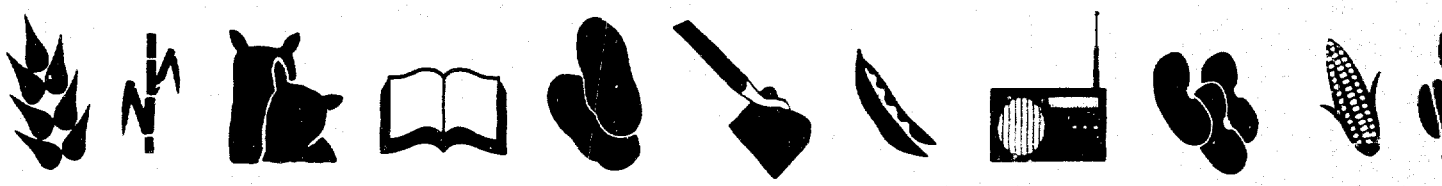

INTRODUCTION

As noted in the previous chapter, the selection of the technologies to transfer is based on the following criteria:

- the combined views of technicians and farmers in identifying the problems the technology is to address, and
- the situation of the farmers in determining which technologies, among those available, are most appropriate for addressing the problems.

Those technologies must go through a process of testing and adaptation prior to their transfer.

This process involves the following steps:

1. The technologies must be *translated* into codes and references that the farmers will be able to understand,
2. Next, they must be *tested* with the farmers themselves to ascertain the ease or difficulty of implementation,
3. Based on the results of this test, the technology must be adapted to the characteristics of the farmers, to enable them to put it into practice,
4. The technical validity of any adaptations made must then be verified by the researchers.

WHY TECHNOLOGIES MUST BE ADAPTED

The technologies available in research centers are not always directly transferable. They may not have been developed with an in-depth knowledge of the capabilities and characteristics of the farmers. And farmers have not participated in the testing of these technologies.

In the traditional method, the technology is applied by the researcher on one farmer's field and then compared with the results from experimental plots. The farmer is not involved; the researcher alone does the verification, since the researcher has information and inputs not always available to the farmer.

The problem with this method is that it only evaluates the effect of the technology with respect to the land and the crop, and not whether it can be used by the farmer.

If a farmer who has grown potatoes using traditional methods were to use a machine to break up and turn over

the soil, the result would be greater germination, greater root development and, consequently, a larger number of tubercles. This would be the case even if the farmer did not modify any other aspect of this particular crop's management. This makes a technology involving the use of a particular machine for preparing the land and breaking up the soil technically valid; but it does not necessarily make it transferable. Traditional farmers have no access to agricultural machinery. Promoting technologies of this type to these farmers is a waste of time and resources.

The same is true with technologies requiring the use of costly or unavailable agricultural inputs, or those having a cost in terms of effort or labor that increases work to levels that are unacceptable to the farmer. Other barriers to technology transfer may be cultural in nature-as when farmers are asked to do something that is contrary to extremely deep-rooted beliefs. In these cases, only a practical demonstration may move some farmers to take the risk involved.

The proposed technologies should be adapted to the users' ability to put them into practice effectively using their own available resources-if they can afford the cost-and in accordance with their own particular characteristics-if the technologies can be incorporated into their living systems and *modus operandi*. The best way to evaluate and adapt a technology is to analyze, together with the farmers themselves, the ease or difficulty of its application. Then, based on this analysis, the researchers make the necessary adaptations so that, with little or no loss of effectiveness, the technology can be put into practice by the farmers.

DEEP-ROOTED LOCAL BELIEFS

Pulling up the *quinua* and *kiwicha* plants (traditional Andean crops) causes considerable loss of grain during their harvest, due to the fragile nature of the spikes. Cutting them would enormously decrease such losses, but Andean farmers think that if they cut these plants, they will be unable to grow that crop again in that field.

No matter how often farmers are advised to cut the plants, none of them will do so unless it can be substantiated that, in spite of such cutting, the crop will indeed grow again. And none of them will risk a field for testing. Perhaps research can provide new varieties with sturdier spikes and more tenacious kernels that will not be lost during the harvest.

WHO SHOULD CONDUCT THE FIELD TEST

The testing and adaptation of each technology should be carried out in the field with the extension worker and the researcher-for example, an entomologist dealing with pest control-working together with the farmers. The farmers should be visited, either individually or in groups, when the activities involving the technology to be transferred are about to begin, or have already begun, on their plots.

Individual farmers are visited as they work in the field. Or, a group of farmers can meet with the extension worker in one of their fields to carry out a test activity. This is easier where farmers' organizations, such as co-ops, *campesino* communities or producer committees exist.

Under normal conditions, it ought to be possible to visit and work with two or three farmers per day on an individual basis, or with one large group every day. It depends on the distances between the farms.

HOW TO TEST AND ADAPT THE TECHNOLOGIES

Translate the technologies into codes and references that the farmers can understand.

Adaptation of the technologies should begin with the organizations where they have been developed. *For example,* some technologies, such as fertilizer or chemical products to control pests, require the use of measurements. The tests performed in the development centers must take into account the measures used by the farmers. Instructions should then be converted into the measurement terms that farmers will understand.

Recommendations are tested and converted first with the researchers in the technology-development centers and then field tested. *For example,* in the case of fertilizers, the proposals developed by the researchers are always based on *kilograms per hectare* (ha.). But sometimes the farmers' plots measure less than one hectare, or the farmers measure their lands using methods other than the decimal system. In the Ancash mountains of Peru, farmers may measure their lands in *yugadas,* although they also know the extent of their lands in hectares. In Puno, each farmer has a number of furrows in a common *aynoca.* In Indonesia, farmers measure their lands in *baus* (1 bau equals 0.7 ha.).

Before a technology requiring measurements related to the size of the land is transferred, it must be converted and presented to the farmer in familiar terms, so that the farmer will know the correct amount of product to buy.

In the case of fertilizer, the instructions to the farmer should be expressed in terms of the amount of fertilizer needed for the traditional unit of land. The farmer also must be told the amount of each type of fertilizer required for each plant. Different alternatives should be proposed, based on the average size of the plots in the area, so that the farmers can find a point of reference for their own use. Then, as the farmers test the technology, they are observed in action to see if the instructions and measurements are understandable. The same procedure should be employed for chemical products used to control pests. Calculate the proper amount of product necessary to apply in the terms used by the farmers to measure their land.

Organizations normally recommend that chemical products be prepared using measurements from the decimal metric system, which is unfamiliar to many farmers. These measures should be converted to references known to and used by the farmers. *For example, deciliters* should be converted to *tablespoons*, or any other common measure. Farmers' reference terms should be identified during the assessment to use in this conversion.

Also, the measures for using chemical products are given as a function of the volume of the device used for their application: *for example, 10 deciliters per 15-liter backpack pump.* In many places, this particular piece of equipment is not used by low-income farmers. As seen in the example, adapting the recommendation involves modifying these measures so that they can be used with the tools available to farmers.

Check the technologies with the farmers to determine the ease or difficulty of their implementation.

Once the adjustments have been verified with the researchers or other technicians, the technology must then be tested and further adjusted with the farmers. For testing, list the technologies in sequence, according to the agricultural calendar to be followed for each crop.

Each agricultural activity takes place at a certain time: the testing and adaptation of the technology must be carried out within this time period. If the implementation period is short, the testing and adaptation of the technolo-gy should begin at least two weeks earlier. *For example,* in some places

AD^PTING THE TECHNOLOGY IN TERMS FAMILIAR TO THE USERS

For example, to adapt the instructions regarding use of a pesticide, take the following steps:

1. For a production problem, identify at least two products that are available in the area and whose effectiveness has been substantiated by the researchers.

   This is done for the following reasons: The first involves price. If the products have different prices, one may be more affordable to low-income farmers. The second is the competition of a wide variety of products on the market. Products containing the same ingredients but having different names always find supporters or detractors. If no alternative is offered, there will always be someone inclined toward another, so it is advisable to recommend an alternative.

2. Since recommendations for use are generally given for one *hectare* (ha.), convert to hectares the measures used by farmers for their land.

   For example, in the case of Indonesia, the measure is one *bau*, which is equivalent to 0.7 ha.

3. Then convert the recommended dose for one hectare to the dose necessary for the unit of land measure used by the farmers.

   For example, for a product that has a dose of 500 *grams* (gr.) for one hectare, convert the dose to one *bau* by the following calculation:

$$\frac{500 \text{ gr.} \times 0.7 \text{ ha.}}{1 \text{ ha.}} = 350 \text{ gr. for one } bau$$

there are activities, such as planting, that should be performed within a short period of time based on the availability of rain; in others, the availability of irrigation extends the time for planting.

HOW TO TEST TECHNOLOGY TOGETHER WITH THE FARMERS

The sequence for testing the technology with the farmers is as follows:

1. The new technology or technical behavior is proposed to the farmers for that particular phase of the crop cycle.

The same calculation applies for liquid products.

4. If a product does not come with its own measuring device, convert the application dose to measures that the farmer can obtain easily, such as tablespoons, cans of common products or *cups*.

If the recommended dose is, for example, 60 gr. of a powdered product, to be dissolved in 15 liters of water, determine how many tablespoons of product are necessary to make 60 grams (or how many cups or other common units of measure).

For example, in Marcará, Peru, when certain products did not come with a measuring device, the farmers were told to use six heaping tablespoons or a measure equivalent to one can of tuna fish for one 15-liter backpack pump. The empty tuna fish cans are commonly used as containers and measuring devices in the area. One can is equivalent to six heaping tablespoons of powdered pesticide.

If the dose refers to the volume of an applicator, such as a backpack pump, and another way of spraying is to be used, identify a common container, measure its capacity and calculate the corresponding recommendation.

For example, the cauldrons used in Marcará hold approximately eight liters. In recommendations for preparing the mix in a cauldron, half the dose recommended for a 15-liter backpack pump was suggested, and it was recommended that the cauldron not be filled completely.

5. Verify with the researchers or crop specialists the validity of the new measures.

2. The new technology is compared to the technology currently being used.
3. The technical team obtains the farmers' opinions and views on the proposal, to determine whether they understand the rationale behind it, and their ease or difficulty in implementing the proposal.
4. The farmers apply the proposed technology on a few rows in the presence of the technicians.
5. The degree of ease or difficulty the farmers have in putting the technology into practice is observed.
6. The farmers suggest improvements in the technology.

- If the farmers have not yet begun the activity for that particular phase, talk with them about the current practices they use as well as the

ADAPTING TECHNOLOGY IS A COLLABORATIVE AND CREATIVE EFFORT

In the area of Marcará, Peru, the campesino communities have a traditional division of labor. Lands that belong to the community as an organization are worked by all members equally, and tasks are distributed equitably among various groups.

The CTTA Project took advantage of this situation and, together with the extension workers and researchers, visited the communal lands on those days that the community had designated for performing some specific task. In this way, they found large groups of farmers in the fields carrying out various agricultural tasks. For example, to test the new method for planting corn, they visited a field located in one of the communities the day when a large group of community members had gathered to plant the corn.

When the CTTA team reached the field, the extension worker requested that the person in charge of the activity ask the group to stop work for a moment to listen. They did so, and a group of men gathered around the extension agent. The women, although listening to everything, positioned themselves discreetly behind the group, as is their custom.

The extension worker explained the reason for the visit. He described the way in which the farmers were planting, by placing a continuous stream of seeds along the furrow behind the team of oxen, and he explained the problems that this way of planting caused for future production. He also described how the furrows were being cut too close together and explained that the roots would subsequently be affected by weeding and other activities. The farmers appeared to be interested; they had never thought that planting could be a problem.

The extension worker then described the researchers' proposal that holes be made on one side of the furrow, some 60 centimeters apart, and three seeds be placed in each hole. He explained the reasons for this new proposal and the advantages that it offered for proper growth of the crop. A look of discouragement could be seen on the faces of many of the farmers, as if the extension worker were taking up their time for no reason.

Some farmers said that it was too complicated. They said that the women placed the seeds and that they would not understand this new way of planting, which the men themselves did not clearly understand. Some were familiar with this way of planting, as it was more common in the coastal regions where they used to work as farmhands during certain seasons of the year. But in the project area, farmers do not use a tool for making holes and, moreover, to ask the women to use a tool implied a considerable extra effort in an activity, which, as a rule, was easy-placing the stream of seeds behind the oxen.

By that time, some farmers had already returned to work and were calling to the other not to waste their time so that they

could finish their day's activities quickly. The group leader was asked for permission to work with a few of the women using the proposed technique on a few rows. Although use of the tool was rejected definitively, the researcher felt that it would be sufficient if the women planted the seeds at the proposed distances.

The women were instructed how to proceed. None of them had any idea how long 60 centimeters was. They were shown how long the distance was in the row itself, and were asked what that particular distance meant for them. The women concluded that the measure was *tres cuartas largas* (three long spans), in other words, the equivalent of three measurements made easily with the hand. This measure would be used in the future.

The women were then followed step by step while they placed the seeds. In most cases, they failed to adhere to the distance agreed upon. When asked why they did not keep to the distance, they responded that it was somewhat difficult to calculate the difference without a reference point.

The leader of the group, who participated in the discussion, suggested cutting sticks of the required length and giving one to each of the women, so that they could use them as a reference. And that was the way it was done: the women, sticks in hand, would place the seeds and then use the stick as a support when straightening up.

The researchers and extension workers observed how the campesinos made the furrows. The man who drove the oxen would turn around at the end of the field and return too close to the previously cut furrow. Although it was explained to them that they should attempt to leave a greater distance, they were unable to visualize such a distance clearly without a practical point of reference. The idea of the sticks was brought up once more. A stick tied across the plow was a good point of reference to begin with, until the oxen driver got used to the new distance. The method was tested and found to work well.

When they arrived back at the field the next morning, the researchers and extension workers had with them a technological proposal that they had tried for years to transfer without success, except with more technically advanced farms located close to the river. By noon, an intermediate proposal had already been developed that included the technical principles of the original proposal but was adapted to be managed easily by all farmers.

When the newly adapted proposal was submitted to other groups of farmers, it was understood immediately and put into practice without difficulty. Later, during the dissemination stage, activities designed to promote adoption of the proposal persuaded many farmers to apply it. Those who did experienced no difficulties implementing the concept.

proposed technology, comparing one to the other and taking note of their views. Then, if there is agreement, a visit can be scheduled for the day that the work is scheduled to begin to compare the practical application of both alternatives.

- If the farmers are on their land and beginning activity, project personnel should discuss the new proposal with them and encourage them to apply it, at least on a few rows.
- If the proposal involves the use of an input that the farmers do not have available, they should be given whatever is necessary to run the test. This is essential in cases where it is possible to get together a group of farmers to analyze a particular technology requiring the use of an input. In these cases, determine with the farmers the prospects of their obtaining the input and whether they will be willing to purchase it.

The researcher and the extension worker should observe the way in which the farmers apply the technique and whether they experience any difficulty in implementing it. They should analyze the sequence of actions and determine whether that particular sequence is the most appropriate. This analysis serves to break the technology down then into behavior sequences, so that it will be easier to understand.

If the difficulties involve an inability to understand the sequence or a misapplication of that sequence, these problems should be taken into account when preparing communications materials. If the difficulties involve an inability to understand measures or figures, these have to be translated into measures that are commonly used in the area or well-known reference points, to see if understanding improves.

However, if the difficulties arise from the fact that the farmers cannot afford or obtain an input in the area, the researchers must find another alternative or determine how the technology might be applied without using that specific input.

Finally, the farmers give suggestions as to how to adapt the requirements of the proposal to their actual ability to put it into practice.

A LITTLE BIT OF INGENUITY HELPS

Proper preparation of the land requires turning the soil over to a particular depth. Without considerable effort on the part of the farmer, the plows used do not reach that depth easily. This problem can be overcome by making more passes with the plow, but this requires more time and effort from the farmer and entails a greater cash outlay in terms of rental costs for those farmers who do not own oxen.

A new technology may mean the use of machinery or a new, improved plow. However, it may also mean that by adding weight to the plow currently in use (tying a rock on top of the plow), the farmer is able to increase the depth of the cut without exerting any additional effort or cost.

Modify the technology based on the results of the testing.

Once tested, a technology may require the following changes and adjustments:

- **Mechanical:** when a technology requires a tool or input not currently available. This may mean modifying a tool or input that is currently available to fulfill the desired function.

Or, when a technology input is not affordable or available, a mechanical substitute is sought. *For example,* pest control performed manually or with traps instead of pesticide.

- **Chemical:** when changes are required in the dose of an input, such as a pesticide or fertilizer, to make it effective under particular conditions of application.

For example, the application of a pesticide with a backpack pump is affordable for very few farmers in the highlands of Peru. If the idea is to wet the leaves or fruit of the plants by spraying, other instruments such as paint brushes, sprinkler heads and jars with holes in the lids can be used. This mechanical adjustment involves a simultaneous chemical adjustment: the dose must be modified so that this applicator will be as effective as the backpack pump.

- **Biological:** when there are no chemical inputs available and biological inputs can be used in their place. *For example,* organic fertilizer instead of chemi-

cal fertilizer or pest-controlling insects instead of pesticides.

Verify the technical validity of the changes and adaptations made to the technology with the researchers.

All adjustments to a technology must be checked with the crop specialists, who should determine whether the alternative resulting from the adaptation is as effective as the technology proposed initially. If necessary, they should test it themselves. It may be that it is less effective than the technology originally proposed. However, if the alternative is more appropriate for the farmers, and shows a greater probability of being adopted, it should be considered a valid alternative and promoted as such among those unable to apply the original technology.

In addition, the farmers should be made aware of their primary role in the search for solutions with the researchers. Their traditional knowledge of agriculture and their own technologies should be given consideration, and their scientific validity should be studied.

Once a technology has been adapted, it is possible to fill in the tenth and last column on the TABLE OF AGRICULTURAL PRACTICES: "Intermediate Behavior Alternative." This column should contain a detailed description of the new behavior, as adapted, that is to be promoted among the farmers. (*See the sample table.*)

TABLE OF AGRICULTURAL PRACTICES

CROP: _____ ACTIVITY: _____

1	2	3	4	5	6	7	8	9	10
Current Farmer Practices	Reasons for Current Practices	Benefits Perceived from Current Practices	Cost of Current Practices	Problems Represented by Current Practices	New Proposed Practices	Reasons for Proposed Practices	Benefits Offered by New Practices	Cost of New Proposed Practices	Intermediate Behavior Alternative

CHAPTER SUMMARY

The technologies or behaviors that the farmers are to incorporate into management of their crops must be adapted to the characteristics of those farmers, and modified to accommodate their ability to adopt them and put them into practice.

The following steps should be taken when field testing and adapting technologies:

1. The technologies should first be translated into measures and terms that the farmers are able to understand.
2. They should then be tested by the farmers themselves, to analyze the ease or difficulty encountered in putting the technologies into practice.
3. Based on this analysis, necessary adjustments are made to the technologies.
4. These adjustments are verified with the researchers with a view to formulating alternatives for different segments of farmers, considering their characteristics and available resources.

CHAPTER IV

Step 2.2
Communications Strategy Design: How and When to Open Channels for Technology or Transfer

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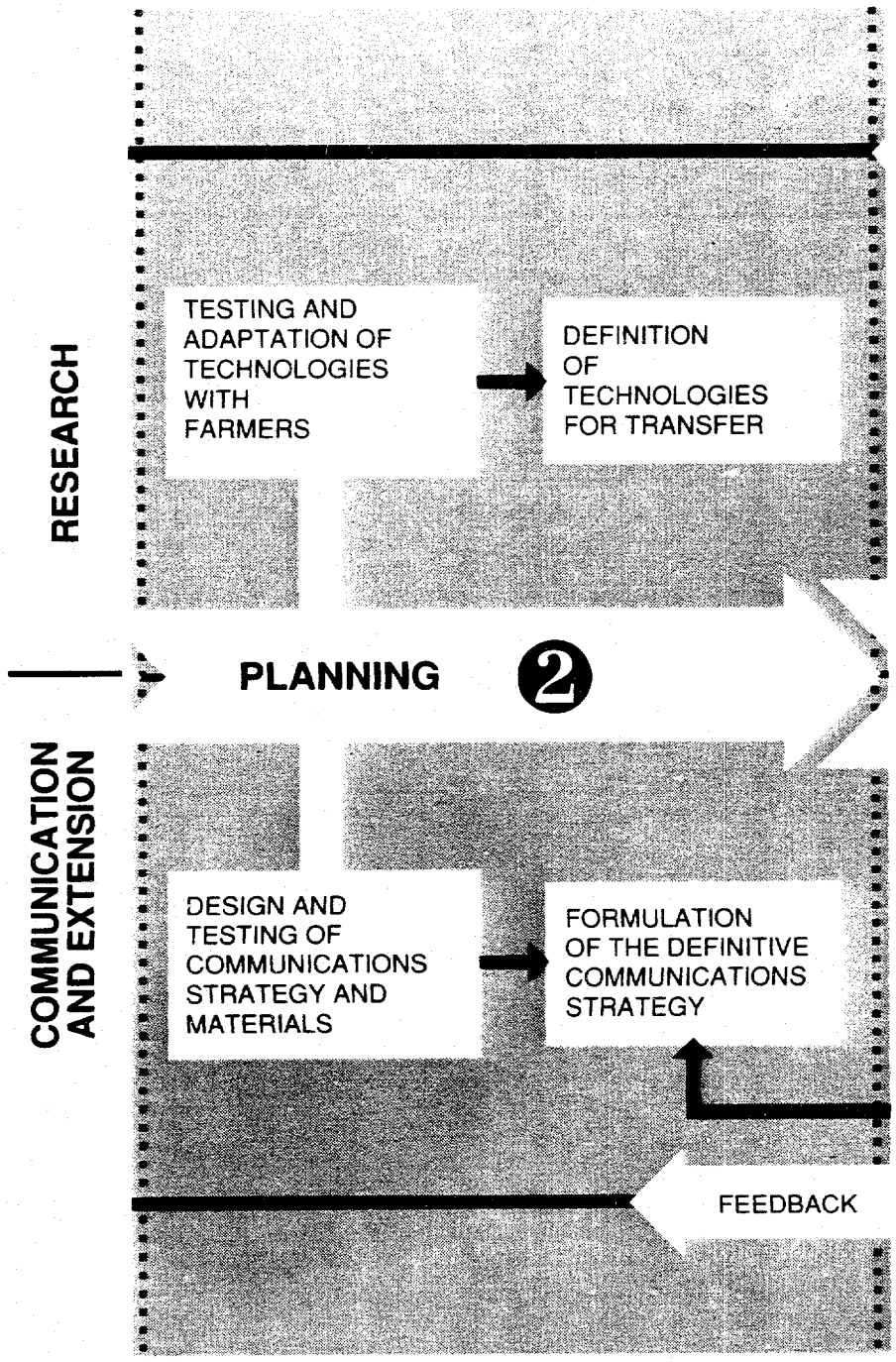
THE CTTA METHODOLOGY



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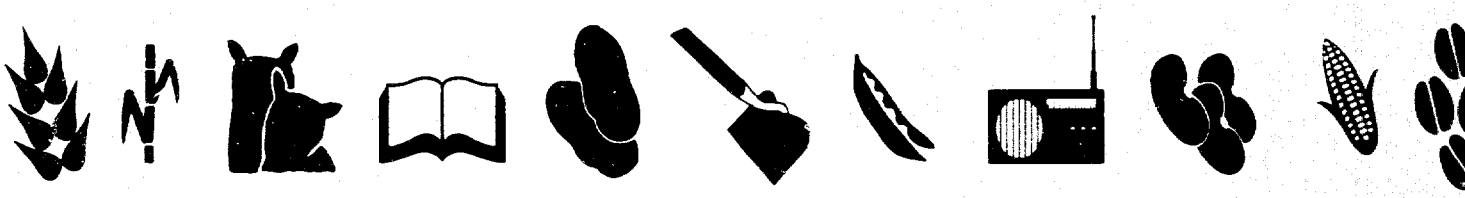


INTRODUCTION

The results of the assessment provide us with the basis for formulating the communications strategy and for testing and adapting technologies. As the researchers are testing and adapting the technology, the communicators are planning for its eventual transfer. In formulating a communications strategy, the following elements must be clearly defined:

- the objectives to be achieved with the strategy;
- the target users to whom the communications are directed;
- the messages to be disseminated;
- the communications media to be employed;
- the strategy's implementation timetable;
- the coordinating mechanism to integrate the various media and factors into a common approach; and
- the monitoring, evaluation and feedback mechanisms that will track the progress of the strategy.

The strategy design depends on the circumstances and context of the work. The important thing is that communication for technology transfer be a carefully planned and systematized effort. The transfer of knowledge and behavior requires the convergence of a number of different scientific disciplines working in an integrated manner, each contributing its various advantages. The social sciences, behavioral psychology and social psychology, adult education and pedagogy, advertising and public relations must all be combined to achieve the objectives of the strategy.

OBJECTIVES OF THE STRATEGY

Generally speaking, the communications strategy seeks to change farmers' attitudes and behaviors with regard to crop management, enabling them to increase crop productivity and improve their standard of living.

Specific objectives

1. **Inform** the greatest possible number of farmers about new technical practices involving crop management,
2. **Motivate** the greatest possible number of farmers to adopt and put into practice those new technologies,

3. **Train** those who adopt the practices to apply them correctly to obtain the planned results.

Given the nature of the objectives, the communications strategy for technology transfer should be a combination of efforts in the areas of:

1. **dissemination,** to achieve broad coverage;
2. **communications,** to achieve a motivating exchange with the farmers; and
3. **education,** to successfully train the farmers in the correct practices.

AUDIENCE SEGMENTATION

Achievement of these objectives requires focusing communications not only on the farmers but also on those other audiences who, either directly or indirectly, are involved in agricultural management. These other audiences should be defined clearly and included in the communications strategy. This strategy should plan specific efforts for each of the groups. Following is an initial segmentation of the audiences on which the communication efforts for agricultural technology transfer are focused.

Primary audience

These are the farmers to whom transfer efforts are directed. This primary audience is defined and analyzed by the assessment. In turn, this group is divided into subgroups having homogeneous characteristics, to direct specific messages toward them: men and women, low-income

EVERY TECHNICIAN IS A COMMUNICATOR

The Ministry of Natural Resources in Honduras had a heterogeneous group of extension workers and researchers. Their academic backgrounds varied widely, from agronomy to teaching. These people were all trained in:

- communications techniques for technology transfer;
- oral expression and group dynamics; and
- selection and use of educational aids.

Because of their training, these individuals were better prepared to implement the transfer activities.

farmers, farmers better able to buy inputs, and identified others.

Secondary audience

The secondary audience includes those other individuals directly involved in the production process: extension workers, communicators, researchers and technicians. These professionals must be aware of the messages as well, and be trained in the various elements of the strategy. This is a key aspect of the methodology's institutionalization.

Tertiary audience

This audience consists of those individuals who, whether or not involved with the transfer organizations, indirectly influence support for the strategy and the related decision-making process. This group includes directors of local development organizations, political leaders, advisors, planners and vendors of agroinputs, among others.

IN SEARCH OF UNIFORM TRAINING

In Marcará, Peru, a plan was designed for training extension agents in the technologies to be transferred. The training's objective was to consolidate all extension personnel's knowledge about the researchers' technical recommendations for each crop.

The project team also hoped that this would provide consistency in the advice and messages that the farmers received from official sources. At the time the CTTA Project conducted its initial assessment, it discovered that the extension workers were offering advice according to their own criteria. As a result, suggestions were offered that were not only different but, on occasion, were contradictory as well.

The training plan included preparation of technical manuals covering the technologies for each crop. Researchers wrote these manuals, which formed the basis for the refresher training of the extension workers in the area. In other areas, researchers offered direct training to extension workers prior to the start of the agricultural campaign by explaining the technical recommendations that were to be transferred.

THE IMPORTANCE OF DISSEMINATING INFORMATION ABOUT THE ACTIVITIES

In Peru, CTTA Project staff gave many talks on the transfer methodology and the strategy that was being implemented. These talks were given to the management staff of the local implementing organization to stimulate commitment to the program and strengthen support for it. During the first year of work, at least one presentation per month was planned for this purpose.

Presentations also were made to other local and national development organizations to develop support for program objectives. Likewise, a carefully planned strategy for distribution and circulation of technical reports and other documentation sought to keep the various directors of other programs interested in the CTTA Project. Their cooperation provided considerable support for the program's goals and the achievement of its objectives.

FORMULATING THE MESSAGES

Analysis of the assessment makes it possible to fill in the TABLE OF AGRICULTURAL PRACTICES for each point in the agricultural cycle at which it is necessary to intervene. This table includes a determination of the new technologies or behaviors to be transferred to the farmers. The table forms the basis for developing the messages to disseminate under the communications strategy. (*See the table.*)

1	2	3	4	5	6	7	8	9	10
Current Farmer Practices	Reasons for Current Practices	Benefits Perceived from Current Practices	Cost of Current Practices	Problems Represented by Current Practices	New Proposed Practices	Reasons for Proposed Practices	Benefits Offered by New Practices	Cost of New Proposed Practices	Intermediate Behavior Alternatives

The messages answer the following questions:

- What do the farmers need to do?
- What do the farmers need to know to motivate them to adopt the technology and correctly put it into practice correctly?

The answers to these two questions will be found when the table is filled in with the results of the assessment.

DESCRIBING PRACTICES FOR SOUND FERTILIZATION

One of the technical recommendations for fertilizing corn in Marcará, Peru, was to apply a given dose of each fertilizer (nitrogen in the form of *urea*, phosphorous in the form of *triple calcium superphosphate* and *potassium* in the form of *potassium chloride*) twice: once at planting time and again at the first hilling-up, when the plant is only about 50 cm. high.

The given amounts were converted into bags of each fertilizer per hectare. Alternative amounts were also provided, based on the type of land (dry or irrigated) involved, and the particular variety of corn that the farmer wished to plant.

The techniques and information for dissemination were broken down as follows:

Practices

- At planting time, just before planting, mix together half the dose of nitrogen and the entire dose of potassium and phosphorus. To do this, the three fertilizers can be placed in a cloth or piece of plastic and stirred well with a shovel,
- At planting, apply a handful of the mixture about one hand's breadth away from the spot where the seeds are laid and cover it well; while one person places the seeds, another follows after with the handful of fertilizer,
- Irrigate that very day, until the earth is well soaked,
- When doing the second hilling, fertilize again with thu remaining nitrogen,

What the farmers need to do.

To define what the farmers should do, each technology is broken down into the sequence of steps to do it. This breakdown must be performed carefully to avoid omitting any step or the slightest detail. The answer to this question emerges, then, from a detailed sequence of the practices described in column No. 6, *Proposed Practice,* of the TABLE OF AGRICULTURAL PRACTICES first presented in Chapter II.

- To apply the fertilizer make a hole at the top of the furrow, between the two plants, and place a handful of fertilizer on it, covering it when hilling-up,
- Irrigate that same day following the hilling.

Information

To accompany the above actions, the following information was provided:

- It is necessary to apply all three types of fertilizer; the farmer must be aware of the relationship between the fertilizer, the various stages of growth of the plant and the formation and full development of the kernels,
- The fertilizer should not touch the seeds during planting because it will burn them. For this reason, the fertilizer must be placed at least one hand's breadth (10 cms.) from the seeds,
- The roots absorb the fertilizer from the soil and for this reason the fertilizer must be covered with earth,
- For the fertilizer to be absorbed by the roots, it must be dissolved by water in the soil, which is why irrigation should be done on the same day as planting,
- The roots of the corn plant grow horizontally at both sides of the plant. The handful of fertilizer used at the hilling should be placed between the plants,
- Nitrogen evaporates and loses its effectiveness when exposed to air. When fertilizing, it must be covered with dirt as soon as possible, and when stored, it should be kept in tightly closed sacks free of holes.

What the farmers need to know in order to motivate them to adopt the technology and correctly put it into practice.

This question should be asked for each step of the sequence. Each new practice must be justified. Communicators must put themselves in the place of the farmers and, for each proposal, answer the question, "Why?," anticipating that the same question will be asked by the farmers. This response is found in column No. 7, *Reasons for the Proposed Practice*, in the TABLE OF AGRICULTURAL PRACTICES.

Sometimes an explanation is sufficient for the farmer to be able to understand and accept the proposal. *For example,* knowing that nitrogen evaporates when exposed to air

makes it much more likely that farmers will accept new methods for applying or storing their fertilizer.

Understanding the connection between current practice and any problems that occur with the crop is also a motivating factor for acceptance of a new proposal. *For example,* if farmers understand the way their current technique for preparing the land hinders uniform germination of the plants and invites the appearance of pests, they are more likely to agree to test another technique for preparing the land.

Another motivating factor is the benefit that the new behavior will provide in the short term. *For example,* the benefit to properly preparing the land is seen in the stronger and more uniform germination of the plant.

The trade-offs between the costs of the traditional practice and those of the one proposed can also influence the farmer's acceptance. *For example,* planting the corn by placing groups of three seeds spaced a given distance apart requires more effort than planting the seeds by a continuous sprinkling action in the furrow, but it will be easier to irrigate, hill-up and harvest the plants, and the plants will produce larger ears.

Finally, farmers require a certain amount of information to use the techniques correctly. Communicators should always ensure that the messages answer the question, "How?" *For example,* proper measurements, distances, and volumes are necessary to apply a pesticide correctly. In addition, the farmer needs to know how to handle the pesticide safely.

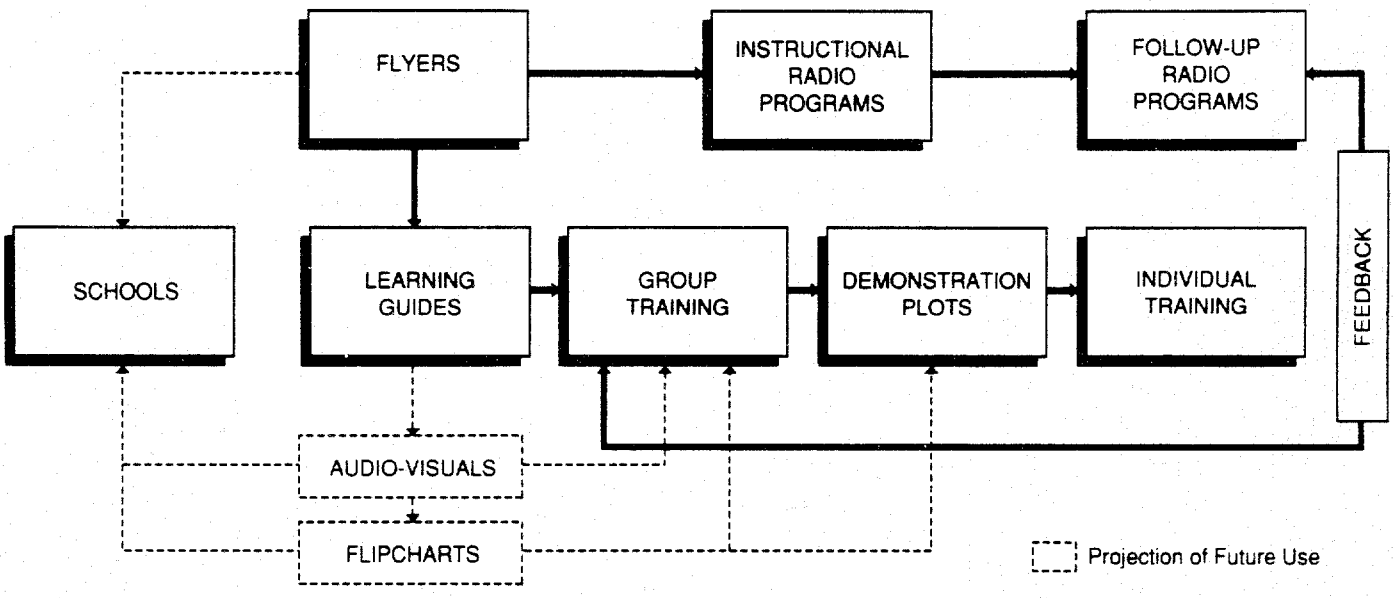
SELECTION AND INTEGRATION OF COMMUNICATIONS MEDIA

The type of communications media to use depends on the objectives of the strategy. In the case of communications for technology transfer, the goal is to convince the farmers to put new or improved technologies into practice correctly. To do this, they must be *informed* of the existence of those technologies, *motivated* to adopt them and *trained* in their proper application.

In communications, there is no "best" medium. No single medium by itself can meet the requirements for achieving broad coverage of farmers to inform, motivate and train them. Each medium has a particular characteristic that makes it more appropriate for one or another of these functions. The key lies in taking advantage of the strengths

of each medium to complement and reinforce the others. (*See figure below.*)

MEDIA INTEGRATION USED IN THE CTTA/PERU STRATEGY



This graph depicts the way different media interrelate in a communications strategy. The example comes from the strategy designed for the pilot area of Marcará, Peru.

Flyers constituted the basic materials for each technology transferred. The flyers graphically explained the se-quence of steps necessary to apply a particular technology. The contents of these flyers were explained step by step through a series of *instructional radio programs* lasting approximately thirty minutes. The *instructional radio programs* were complemented by other radio formats, known as *Reinforcing (review and follow-up) Radio Programs,* which incorporated new suggestions and alternatives, the result of feedback received from the field.

INTEGRATING COMMUNICATIONS MEDIA FOR A COHERENT AND REALISTIC STRATEGY

In Peru, existing, traditional extension programs did not have sufficient resources to give farmers adequate coverage. Traditional extension methods require large staff, trips to the field and the availability of inputs. The "multiplier" effect of farmer liaison did not work due to competitiveness and individualism. Moreover, the violent political situation in the rural areas made conditions increasingly risky for technicians and institutional personnel.

The challenge in the pilot project zone was to design a strategy to address these circumstances. This strategy needed to provide coverage, complement and, in many cases, replace the technical advisor, and be easy to evaluate and adapt, depending on the circumstances.

Research showed that most farmers had radios and listened to local stations. In addition, the farmers indicated that they were genuinely interested in receiving literature on how to improve their agricultural activities. Although the level of illiteracy in the area was high, more than 80 percent of the families had at least one member who knew how to read.

A distance education strategy was proposed, one that would integrate the use of radio and graphic materials and be complemented by group training activities and traditional extension methods. With this strategy, the farmers could receive advice in their own homes over the radio and learn from the graphic materials how to put that advice into practice, while periodically attending group training sessions in their communities and visiting test plots to observe the results.

To turn radio, basically a medium for dissemination and motivation, into an effective training instrument, this medium was combined with complementary graphic materials. Together, they formed an audiovisual medium through which the farmers received over-the-radio explanations of the instructions illustrated in the printed materials. At the beginning of each agricultural cycle or at key times during that cycle, theoretical-practical group training activities were held in the communities to study the graphic materials and practice their instructions. In this way, the extension agents did not have to work with individual farmers (the radio and graphic materials took care of delivering the information to them), but rather with organized groups, reinforcing the individual learning that was taking place through the distance education activities.

After the flyers on each crop technology had been tested, adjustments were made to their format-typeface, illustrations, codes and signs-they were developed into *Learning Guides* for each crop. These guides, in addition to being used by the farmers while listening to the *instructional radio programs*, these guides were used in *Group Training Activities* and served as a reference for the technologies shown in the *Demonstration Plots* and in individual training of farmers by extension agents.

Through contact established with the farmers-Training Activities, Demonstration Plots and Extension Visits-feedback was provided on the technologies and messages transmitted by the radio programs, enriching the programs with new questions, examples and cases taken from the field.

The graphic, sequential presentation of technical behaviors in the Learning Guides, made it possible-budget permitting-to use the guide as a story board for producing audiovisual materials, slides, videos and flip charts. It was also possible for all of the above-mentioned media to be used in area schools for training students in the technologies, since

A COMPLEX ACTIVITY REQUIRES AN APPROPRIATE MEDIUM

To increase the production of vanilla, the plants' flowers must be pollinated. This is a complicated process. All parts of the flower are fragile. For farmers to learn to pollinate vanilla flowers, the process must be shown in photographs, by video or by practical demonstration.

It is impossible to transmit information on how to pollinate vanilla flowers using radio exclusively. Radio can be used to inform a large number of farmers about the need to pollinate their vanilla flowers, but it cannot convey the method for doing so. It has to be taught by an extension agent or through visual media.

ACCESS TO MEDIA VARIES CONSIDERABLY

In Indonesia, the use of video to transfer agricultural technologies is very expensive. Farmers do not have VCRs and very few have television. In Peru and Honduras, most farmers do not have access to television or, in many cases, even to electricity.

In Turkey, however, almost every café, even in rural areas, has a VCR. Farmers get together at the end of the day in the café to talk and relax. This is an excellent opportunity to show them, via video, new cultivation and soil conservation methods. In Turkey, video has proven to be an effective medium.

In Australia, almost every farmer has a VCR and there is no problem with electricity in rural areas. There, the extension service provides a collection of videos that farmers can take home and view whenever they wish. This places taped messages under the control of the farmer, thus video in Australia is a valuable medium for disseminating technologies.

they actively participate in the agricultural production process.

The best medium for convincing a farmer of the advantages of adopting a new technology is, without question, another farmer who has tested the technology and obtained demonstrable positive results. The success of a particular technology will evolve as the various communications media are replaced by interpersonal communication among the farmers themselves, conveying the recommendations.

SOME CONSIDERATIONS FOR MEDIA SELECTION

1. The characteristics of each medium and the nature of the message to be communicated

Each medium has its own particular characteristics that make it better suited to informing, motivating or training. *For example,* to deliver information to a large number of people, radio is a good medium. But to demonstrate a technique or explain the steps to be followed in applying a new practice, radio is not appropriate.

To inform and motivate, an auditory medium with broad coverage, such as radio, is sufficient, but to train someone in the steps for carrying out a particular behavior, auditory media must be supported by visual media. If radio is used, it should be supported by print material. A person explaining how to perform a technique should demonstrate it in front of the farmers, or use photographs, sketches or videotape, to show the sequence of steps involved.

There are media that in some places are more "credible" than others. *For example,* if credibility is sought, in some areas only certain key leaders and individuals satisfy this requirement. If broad coverage and credibility are needed, perhaps this can be achieved by having a recognized leader deliver the message using one of the mass media.

For an announcement, the radio will do. However, to disseminate a sequence of instructions, a medium that will ensure greater retention is needed: graphic material or a video. If a message is to be delivered during the motivation phase, radio may be adequate, but to train, media in which both the action and the results of that action can be seen by the farmers must be considered.

Chapter V: Preparation and Testing of Communications Media and Materials lists considerations for the use of radio, printed materials and group training.

THE BEST MEDIUM IS ONE THAT THE FARMER CAN ACCESS ANYTIME

Video is a very powerful medium for teaching a new technique. But if farmers do not have a VCR and a television set, they will have to depend on someone else, such as the extension agent, to visit their village with equipment and show the videotape. This means that the farmer cannot consult the message as desired or needed, but must depend on the individual controlling the medium.

A technical photo-novel is also a powerful and entertaining medium for teaching a new technique. It is cheap enough that one can be provided to every farmer. The farmer can read the photo-novel at any time and does not have to depend on anyone else or accommodate to the schedule of an extension agent.

2. Access to media and farmer preferences

It is of little consequence to learn about and use a particular communications medium if the farmers in the area do not have access to it.

Farmer preferences relate to their freedom to use one medium or another for obtaining information, entertainment or educational purposes. The credibility assigned by the farmers to each medium, based on what they expect from that medium, is most relevant.

Farmers usually show a preference for those media that they can control themselves. Even in places where illiteracy levels are quite high, farmers request graphic materials. This is because they can carry the message with them and consult it whenever they need to, by asking someone to explain it to them.

The credibility that a farmer assigns to a particular medium is important. In some countries, puppets constitute local communications media and may be very useful for transmitting messages. In other countries, puppets are associated with entertainment for children, not with the transmission of serious or credible messages for adults.

3. The ability of each medium to deliver the message to the farmer in a timely manner

There are certain media whose complicated production makes it impossible to deliver the message on time; when the medium is finally ready, the message is no longer valid. Since agricultural conditions and circumstances are changing constantly, the medium must be sufficiently flexible to allow a message to be adapted whenever necessary. (*See the section in Chapter V on various mass and interpersonal media for informing, motivating and training.*)

Cost

There are two factors to consider about the cost of available media:

- the cost of the medium in relation to its capacity to reach large numbers of farmers, and
- the budget available for implementing the transfer strategy-not only at present but also in the future.

All theoretical considerations of the media are meaningless if the program budget is limited, allowing only the use of very low-cost media. What is necessary is to determine which medium will achieve the stated objective at the least cost.

Nor does it make sense to use media that the organization will be unable to maintain in the future. In this case concentrate on using currently available media, or use the budget on media that are both effective and reusable.

BETTER NOT TO START THAN NOT TO FINISH

The effective distribution of graphic materials requires careful planning and the establishment of networks and channels through which the material will reach the farmers in a timely fashion. This effort pays off only if the network created is fed with consistency. Otherwise, frustration mounts among the farmers. Do not begin a series of radio dramas on a particular subject without being certain of having the budget to continue producing them, at least until a particular topic reaches conclusion.

PROGRAMMING THE COMMUNICATIONS STRATEGY IN STAGES

The guiding principle for laying out the communications strategy over time is that the farmer must receive the message when it is needed. This means that before a farmer can apply a new practice or technology, the farmer must first be informed about it and then motivated to adopt it. Then the farmer is trained or shown how to put the technology into practice at the appropriate point in the crop cycle. The implementation schedule for the strategy is based on the agricultural calendar for the crop or crops to be addressed.

Communication for the transfer of each technology should begin at least two weeks before the technology is to be used and continue through the period during which it is applied.

A communications strategy for introducing a new behavior or technology can be divided into four stages.

1. A stage for informing the farmer about a more useful and advantageous way of performing a task with the technology.

2. A stage for motivating the farmer to test this new way.
3. A stage for transferring the skills necessary to put into practice correctly the new way of working.
4. A stage for repeating the message and making it a permanent activity of those who adopted it, and sparking an interest in those who did not.

THE IMPORTANCE OF EXPLAINING THE REASONS FOR NEW PRACTICES

A farmer might ignore advice to make the hilling higher on the potato crop, unless told that many of the stolons that remain above ground, and become the twigs and leaves of the plant, could, if covered with earth at the proper time, become roots that produce potatoes. This information may persuade the farmer to do the hillings at the appropriate times and at the recommended height.

First stage: inform

The first stage focuses on messages about problems caused by traditional behavior. If problems are perceived by farmers, that perception will be reinforced; if they are not perceived, the farmers are encouraged to identify the problems and resolve them. The alternative offered by the new technology or practice is introduced.

This stage begins one month prior to implementation of the technology and extends up to the point of implementation. Radio programs and spots are appropriate for this stage; posters are also used. Design and testing of materials for the subsequent stages begins.

Second stage: motivate

Messages for motivating the farmers to adopt the new practice are disseminated. The messages refer to the benefits offered by the new behavior in contrast to the problems related to traditional practices. At this stage, the new technique is explained in greater detail. There is also more emphasis on the reasons why the new practice is beneficial.

This second stage begins two weeks before the new technology is put into practice and continues through the

THE COST-BENEFIT MOTIVATION

Knowing that the price of fertilizer goes up with inflation may motivate farmers to purchase it now. Helping farmers to find ways to offset the cost of the fertilizer may encourage them to purchase and apply it. A comparison can be made between the value of an average harvest with and without fertilizer. Subtracting the cost of fertilizer from the difference between the two at the time of the harvest demonstrates that the investment is worth making.

period when it is actually applied. Radio is an appropriate medium for this stage. Distribution of communications materials for third-stage training begins.

Third stage: train

In this stage, dissemination focuses on the steps that the farmer must take and everything that must be done to apply the new technology correctly. This stage starts shortly before and continues during the time the technology is applied.

Upon reaching the third stage, most of the farmers should be aware of the advantages of the proposed technology and disposed to try it. The messages dealing with how to apply the new technology should find ready recipients.

During this stage, it is advisable to continue disseminating messages to inform and motivate. The most appropriate media for this practical stage are **print graphic materials** such as pamphlets and illustrated flyers; **videos; group training and demonstration plots** and **instructional radio programs** to explain the graphics.

Fourth stage: reinforce and follow up

The results obtained by the farmers with the new technologies should be disseminated over the radio and by all other means. The farmers' trust in the messages will be increased and other farmers will be motivated to test the technology being proposed. The results obtained also feed into another stage to motivate interest in the next set of technologies to be promoted.

When planning the stages for each technology, similar to those given in the example, note that these stages often overlap. It is very possible that, in any given month, the training stage of a particular technology, the information

COMMUNICATIONS PLAN FOR THE FIRST FERTILIZATION OF CORN

I. Information stage

Messages:

1. Support the current behavior of those who are already fertilizing. Fertilizing is necessary for a stronger and healthier crop.
2. It is not enough to apply just urea. Explain the function of urea and the other fertilizers in the growth of the plant and the ear. It is better to apply a little bit of each type of fertilizer than to use a single kind.

Media:

- Radio spots and programs; *for example*, two different spots for each message, broadcasting twice daily.
- One poster for Message No. 1.

II. Motivation stage

Messages: (Continue with Message No. 2 from the preceding stage.)

1. It is worth making the effort to get all of the different kinds of fertilizer. There is greater assurance of obtaining a good harvest, and the investment will be recovered many times over.
2. The amount of each fertilizer necessary for a common measure of land. How to obtain them easily. Several farmers can agree to purchase jointly and obtain a better price for a given amount or receive free transportation to their fields.
3. A portion of the urea can be substituted by manure. Money saved can be used to purchase the other types of fertilizer.

stage of another and the motivation stage of a third all overlap. Since the technologies for each crop are sequential, it is necessary to identify the factors that link them together to facilitate their introduction.

The schedule for implementing the communications strategy reflects the timetables for the transfer of each crop's technologies. Indicate in this communications schedule when formative evaluations are to be carried out; they can be at the

Media:

- Radio programs, radio spots.
- Visits to the farmers in their fields.
- Flyers showing the amounts necessary for a measure of land.

III. Training stage

Messages: (Message No. 2 from the information stage and Message No. 2 from the motivation stage continue to be disseminated.)

1. On the day that fertilizer is applied, combine the portions for each by mixing them together with a shovel.
2. Immediately apply a handful of the mix one hand's width above the plant (in the direction in which the irrigation water runs through the furrow), so that the water will carry the fertilizer to the roots.
3. Cover immediately, since the nitrogen in the urea evaporates. Irrigate that same day.

Media:

- Radio programs
- Printed material: illustrated pamphlets, photonovels, flyers
- Demonstration of methods
- Groups training and videos.

IV. Reinforcement (follow-up) stage

Messages:

1. Statements from farmers who are fertilizing correctly, explaining the ease of application and results obtained.

Media:

- Radio spots; broadcast user endorsements over the radio.

end of the cycle for one crop or halfway through the cycle, depending on the facilities available to do evaluations.

COORDINATION

Application of the communications strategy involves the participation of a number of different individuals and groups from within the organization and outside.

TECHNOLOGY DISSEMINATION TIMETABLE

Period for application of the technology (first fertilization of corn) in the area:

Information stage:	from June 15 to June 20
Motivation stage:	from June 20 to June 30
Training stage:	from July 1 to July 15
Reinforcement stage:	from July 10 to July 20

These periods may vary. They shorten in the case of technologies that do not present major obstacles, such as technologies that do not involve the purchase of inputs, but merely represent modifications to current practices.

Analyze research results with the **researchers** to determine which technologies are available to respond to the problems and constraints of the farmers for efficient management of their crops. In collaboration with the researchers, it is also necessary to make adjustments to the technologies selected so that the farmers can readily adopt them. Communications materials should also be shown to the researchers to ensure that their content is technically valid. The researchers also have to be provided with feedback regarding the performance of the technologies in the field and the need for any new adjustments in the technologies.

Coordinate with the **extension agents** to integrate them into the transfer strategy. The advice they give should be identical to the advice promoted in the other media. Their planning activities should be coordinated with the overall strategy. They should install demonstration plots and manage them using the technologies recommended in the strategy, so that they can substantiate the practices being recommended.

Involve other individuals in the transfer process and communications strategy, such as **private providers of technical assistance, vendors of agroinputs and development organizations,** such as the agrarian bank, *for example.* Ensure the availability of recommended inputs for implementing the advice being disseminated, and that all of the technicians are aware of and make the same recommendations, so as not to create confusion. In addition, the strategy should be presented to any other organizations working in agriculture in the area to avoid working at cross purposes.

Proceed in the same manner with **farmer organizations**, such as associations, cooperatives, labor unions and

community groups, to analyze together how they can contribute to the success of the strategy. *For example,* they can issue invitations to group training sessions and distribute graphic materials.

MONITORING AND FEEDBACK

The communications strategy should define a mechanism for supervising activities, evaluating the impact obtained and providing feedback to the various units.

It is necessary to check the entire process ***continuously.*** This means that every strategy must include monitoring mechanisms designed to establish a fluid dialogue with the farmers that will make it possible to get their reactions to the messages.

It is necessary to evaluate ***periodically.*** This means that at given times during implementation of the strategy, consultations need to be scheduled, in the form of **formative evaluations,** that serve to adjust and shape the strategy. The results of these evaluations make it possible for changes to be made in the selection of media, messages and technologies, to adapt them to the needs of the farmers.

It is necessary to evaluate ***at the conclusion of the process.*** This involves evaluating the strategy in quantitative terms to measure its impact and the results obtained by adoption and correct application of the technologies. Last, any positive results obtained by those who applied the technologies correctly must be identified, to test those technologies.

In formulating the communications strategy, establish:

1. when the formative evaluations will be conducted; and
2. when the final evaluation of the impact will be conducted.

The following should be analyzed:

- how to circulate the feedback received;
- how to ensure continuous consultation with the farmer during the transfer process; and
- how to circulate feedback and information from the farmers to the researchers, extension agents and communicators.

Chapter VI: Implementation of the Communications Strategy provides additional information and examples of monitoring mechanisms. *Chapter VII: Evaluation* describes formative and final evaluations, based on the assessment and the same social research techniques.

CHAPTER SUMMARY

The objective of the communications strategy for technology transfer is to ensure that the technology becomes known, adopted and applied correctly by the largest possible number of farmers.

The components of a communications strategy for agricultural technology transfer are as follows:

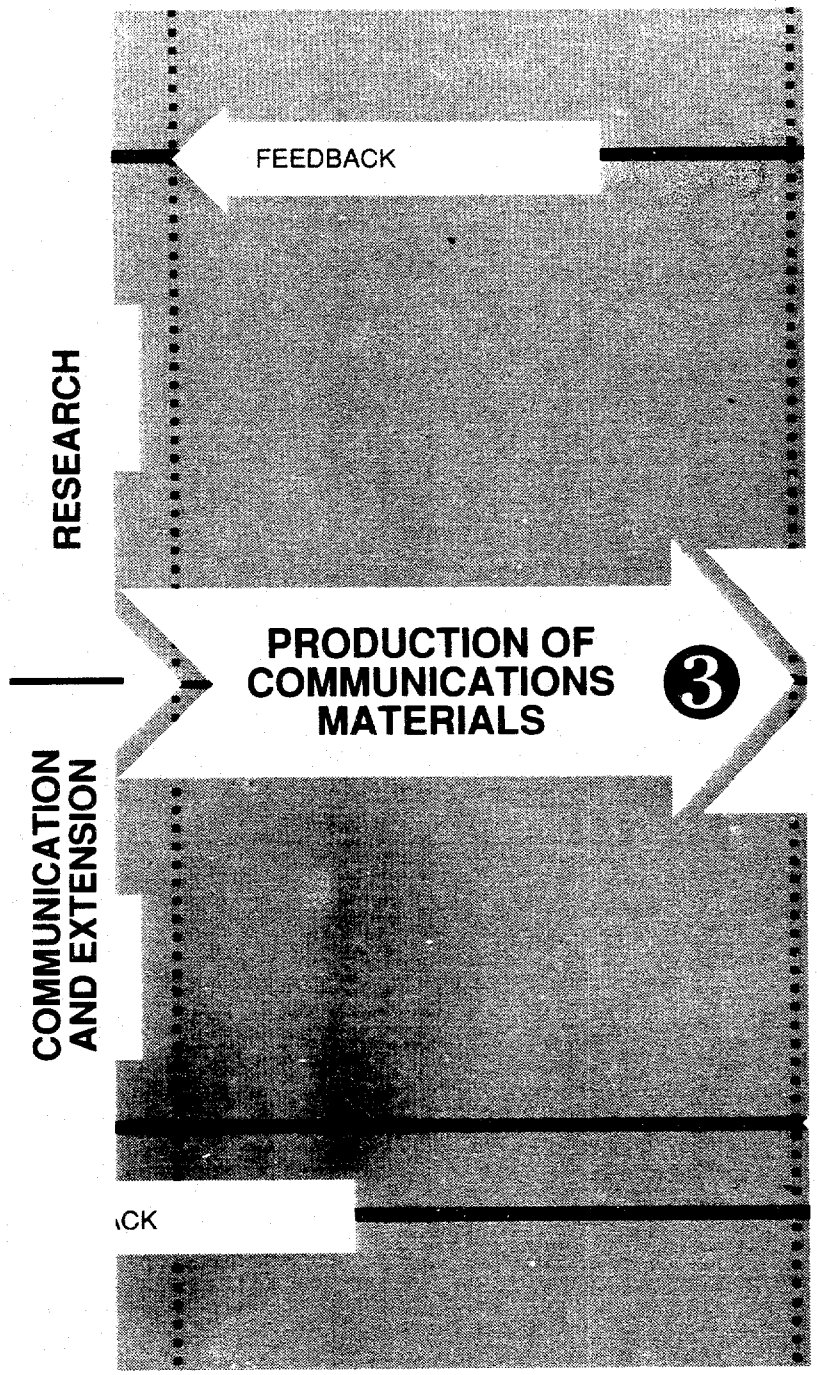
1. Clear definition of the farmers to whom the communications activities for technology transfer are directed,
2. Translation of the technologies into messages about what the farmers are supposed to do, what they should know to become motivated to do it, and how to do it correctly,
3. Appropriate selection of communications media based on the complementary nature and advantages of each to achieve the strategy's objectives,
4. Development of a timetable that will allow timely delivery of messages to the farmers according to the cultivation cycle of their crops,
5. Establishment of efficient mechanisms for intra- and inter-institutional coordination of the strategy,
6. Development of evaluation, monitoring and feedback mechanisms from the various components of the strategy.

A strategy should be sufficiently flexible to allow adjustments to be made as feedback is received, and to refocus strategy components, as necessary, on the objectives to be achieved in the technology transfer process.

CHAPTER V

Step 3
Preparation and Testing of Communications Media and Materials: Clarifying the Messages

THE CTTA METHODOLOGY



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THE PROCESS FOR TESTING THE COMMUNICATIONS COMPONENTS OF TECHNOLOGY 130

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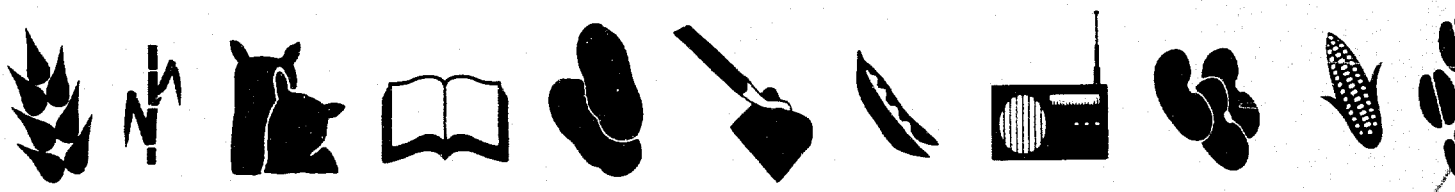


INTRODUCTION

Once the media to be used for the transfer have been chosen, the next step is to prepare the material for those media. This manual does not purport to show how to prepare broadcast or print or interpersonal training materials; there is an abundance of specialized literature on these subjects. This chapter presents some general criteria for the development, design and production of effective informational and learning material.

A basic element in the preparation of effective communications material is the testing of materials with representatives of the target audience prior to final production. Another key element for achieving impact is the integrated and complementary design and use of the material. Once produced, material should not be viewed in isolation but rather as part and parcel of a particular strategy. There should be consistency in the materials produced within a given strategy, and these materials should reinforce each other in terms of information, motivation and training.

It is essential that the staff responsible for media production have a thorough knowledge of the characteristics of the target population group to reflect such characteristics faithfully in the materials. This knowledge is acquired through active participation in each step of the CTTA process. Artists and radio producers should be interviewers in the assessment, and should take advantage of this opportunity to gather visual information (photographs, drawings) as well as auditory information (recordings, vocabulary). The artists should also observe the process of adapting the technologies to be transferred. By taking advantage of the fact that the farmers are testing the proposed practices, the artists can take photographs or produce drawings that can be used later to illustrate the explanatory print materials.

As well as participating actively in the process, media production personnel should make frequent visits to the field to become as familiar as possible with the agricultural activities and their components. Experience will guide them in the selection of the best formats and codes for acceptance and understanding by the farmers.

VARIOUS MASS AND GROUP MEDIA FOR INFORMING, MOTIVATING OR TRAINING

Printed material

Most farmers interviewed about media preference indicated an interest in receiving printed materials, even those who cannot read. The reasons for this are simple:

1. Graphic or printed material remains with the farmer to be reviewed whenever necessary; in other words, the farmer controls the medium. In many cases, illiteracy does not constitute an obstacle, since in most rural families one or more children attend school or know how to read. If necessary, the farmer can ask neighbors to read the material.
2. Written materials in many rural areas are regarded as very credible sources of information. There is respect for the printed word: "If it is printed, it must be true".

Accordingly, the individuals who produce printed material carry a considerable responsibility. A communications strategy for technology transfer should use these materials, or any material that can be controlled by the farmer, as the centerpiece around which the remaining media should be arranged.

Some considerations for the production of printed material

Farmers interpret pictures very literally; therefore, anything depicted in pictures should be complete and reliable.

The optimistic premise that pictures can substitute for textual information for the illiterate is not always true. Any graphic material directed toward farmers with low literacy levels must be prepared in such a way that the pictures alone carry the message to be communicated. However, for farmers to be able to recognize certain codes, they must have a certain "visual" literacy. Most farmers' perception is based on reality as it appears to them. Frequently, codes used to transmit messages in rural settings are not understood because they reflect urban-based visual education. *For example,* "prohibited" symbols similar to those used in traffic signs, are used

occasionally to indicate that a particular action is not allowed. But in some rural areas, such signs do not exist, nor do farmers understand their meaning. The classical skull and crossbones, frequently used to identify a poisonous product, in many cases has been interpreted to mean that the container contains a dead body.

Farmers are not used to having pictures transmit ideas. They must learn that pictures can be instructive.

Farmers may regard drawings and illustrations as just "adornments" and not as visual codes with the same value as words.

When a farmer receives materials containing many different pictures, the first thing said is, "how nice." But if shown the pictures and told that they represent a sequence of behaviors to be carried out, the farmer will understand and can refer back to the pamphlet again and again, as necessary.

HOW A DRAWING CAN LEAD TO CONFUSION

On one occasion, an artist in Huancayo, Peru, was asked to draw a picture of a happy farmer. He drew a male farmer with his arms open and a wide smile of satisfaction on his face. When the material was tested and a number of farmers were asked what the figure represented, some responded that "he is happy." But most said things such as, "He is laughing about something that he sees" or "He is saying hello to someone he knows," and similar responses, including those that indicated "He is on a holiday" and "He has drunk so much that he can hardly stand up, and that is why he has his arms open...."

The artist then drew a few sacks full of potatoes behind this same figure. All those asked now correctly answered that "He is happy. How could he not be happy if he just had a good harvest of potatoes...?" Happiness was a concrete concept that was much easier to interpret when reference was made to an object or situation related to such happiness.

Farmers do not necessarily view a series of pictures in the same order in which others view them.

It is very important to bear this in mind if pictures are to be used to illustrate behavior sequences. The order in which a graphic sequence is to be read or followed is not necessarily the same order used by the farmers.

Ensure that the symbols used in the instructions are understood by the farmers.

Symbols such as snakes crossing something out to indicate that it is not correct, or "prohibited" symbols taken from traffic signals tend to be misunderstood. The best procedure is to use the graphics to show things in a positive light and to demonstrate what *should* be done, leaving the radio to explain what is to be avoided. Symbols or codes with one meaning in one location may have a different meaning somewhere else. This reinforces the need for the representation of reality to be as faithful as possible. It also underlines the fact that prior to production, graphic material designs should be tested on a sample audience of future users.

A DISORDERLY ORDER

In Puno, Peru, the CTTA Project designed its first flyer on alpaca breeding and asked a secretary to add the numbered texts corresponding to the six illustrations, which were not numbered. The illustrations were arranged by the artist in three horizontal rows of two frames each, placed from left to right. But the artist was surprised to see that the secretary placed the text in two vertical rows of three frames each, from top to bottom.

This inadvertent reordering led to the realization that sequence itself needed to be tested. In fact, when the sequence was shown to the alpaca farmers, it was observed that when the frames were not numbered, many farmers would follow the sequence vertically from top to bottom, rather than horizontally from left to right. As a result, the frames were numbered. Failure to take this detail into account might have led to a series of misunderstandings about the order in which the steps were to be carried out.

THE WRONG MESSAGE

An artist in Huaraz, Peru, drew the action involved in hilling a potato patch by showing a farmer working with a *palana* (a long, sharp shovel), used in the coastal area. In the highlands, however, hilling is performed with a hoe, and the *palana* is used to guide water along the furrows during irrigation. Consequently, people believed that what was being shown was a recommendation related to irrigation and not to hilling, or that hilling and irrigation were to be performed at the same time.

On another occasion, the artist drew a sun above a farmer working. His only intention was to add an element of light and happiness to the drawing. This created confusion, because the activity depicted the preparation of the land was performed during the rainy season, when the sun rarely shines. Some people thought that the drawing referred to a different agricultural activity, while others thought it meant that they should change the season in which they prepared the land, waiting until the rainy season was over.

The more elements included in an illustration, the greater the risk of error.

In adult education, the best graphic is the simplest and most realistic one, without adornments or details to distract the viewer from the main idea. An illustration should be a visual aid, not an opportunity to show off the artistic abilities of the artist. Nor should it be a way to "adorn" the text.

Each graphic should contain only one idea. Pictures with different levels, representing several activities at once, are difficult for most farmers to understand.

The distribution of printed materials should be planned and organized.

Timely distribution of printed materials is key to their usefulness and impact. Excellent printed materials are of no use if they never reach the targeted farmers. Distribution is often one of the greatest weaknesses of organizations.

An efficient distribution process begins with a clear definition of the farmer group to which material is to be delivered. Once the type of farmer has been defined, a series

EFFICIENT DISTRIBUTION MAKES IT POSSIBLE TO REACH MANY PEOPLE

In Indonesia, the distribution of 20,000 instructional calendars represented a major challenge. The attractive calendars were sought by many people not necessarily involved in agricultural activities. The design and quality of the calendars tempted others to hoard and sell them, using them as the basis for a "small personal business." Nevertheless, the objective was for them to reach the small farmers and this objective was achieved.

Because women are the ones who go to market to sell excess agricultural produce, it was thought that women might be an excellent channel for delivering the calendars to their families. So, at the entrances and exits to the markets, and in nearby transportation terminals, calendars were distributed to the women who had come to town to sell their goods or who were returning home at the end of the day.

In Peru, the distribution of printed material was also a difficult task. During the first stage of the strategy, extremely low-cost flyers were produced to promote each new agricultural practice. A number of different distribution channels were tested with the flyers: Extension agents and community authorities, schools, group training activities, community work days agroinput stores were tested to determine their effectiveness in delivering printed materials to each *campesino* family in the pilot zone.

It became clear that no one channel was efficient by itself, so distribution in each area was supported by radio messages that informed the listener where or from whom the printed materials could be obtained. The radio announcements helped prevent local authorities from hoarding the materials. Constant field trips by project personnel by extension workers could determine whether the materials were actually reaching their intended audiences.

of distribution channels should be selected and tested. Organizations such as cooperatives, farmers' associations or irrigation committees can be valuable distribution channels. Supply stores can distribute printed materials, and community authorities, school teachers, priests or religious leaders can also help with distribution.

Once the most efficient distribution channels are identified, they should be promoted using other media. *For example,* radio programs can advise farmers to pick up a

particular material free of charge at a certain location. The interested farmer must then seek out the material at the distribution center.

The preceding points clearly demonstrate that printed graphic materials, although very much in demand by the farmers, are only part, although perhaps the primary one, of an integrated media strategy. Printed material is used to complement and reinforce oral explanations or is, in turn, reinforced by radio programs.

Radio

Just as printed material tends to be favored by farmers, radio tends to be the medium preferred by organizations. This is because:

- Radio provides very broad coverage; the actions of organizations are frequently measured more in terms of quantity than in terms of impact,
- It always seems easier to talk into a microphone than to prepare graphic materials,
- The production costs of radio are lower than the costs of printed materials,
- Radio gives high visibility to organizations in the field.

However, some of these reasons are losing their validity. Radio coverage varies. Rural electrification in many countries has not increased at the same rate at which inflation has increased the cost of radio batteries. The latter, together with the aging of portable radios and the increasingly high cost of replacing the unit, or even occasionally repairing or maintaining it, has made farmers quite selective about radio use. Also, the vast number of radio stations operating in many regions provides farmers with many listening choices.

This makes it clear that a radio program must be truly interesting, useful and entertaining for a farmer to listen to it. And making interesting, useful and entertaining radio programs is a specialized discipline. This fact makes the notion that it is easier to produce radio programs than other media increasingly less valid.

For farmers to listen to a radio program, it must be broadcast during the hours when they are home and normally listen to the radio. These prime listening hours are often intensely competed for by those who wish to reach this

important consumer segment. Furthermore, the costs of radio time are rising steadily.

Although radio continues to be a sure medium for delivering messages to rural areas, increasingly sophisticated use of it is necessary to capture the attention of farmers and transform that attention into a genuine interest in the messages broadcast.

Some considerations for production of radio material

Radio broadcasts must be timely.

Messages should be broadcast at those times when the target audience normally listens to the radio and on the preferred radio stations. The preferred listening times and stations should be determined during the assessment.

The content of the broadcasts should reflect the technical information needs of the farmers at that particular moment. Radio, unlike graphic material, is a medium that the farmer cannot control. The messages cannot be heard on demand. If a message is broadcast before the farmer is ready for it, it may be forgotten when the time comes to use it. If a message is heard after the advice was to be applied, the farmer becomes frustrated because this information was not available beforehand.

Radio materials should be produced in the language of the farmers.

Different languages are sometimes spoken within a particular area. There are also places where, even though they speak the same language, certain groups have their own "jargon" or ways of expressing themselves or referring to things. Using the vernacular of the group to which a broadcast is targeted is a key element in stimulating the group's interest and ensuring their comprehension and acceptance of the message. The assessment should identify bilingualism in an area, or simply the vocabulary related to a particular agricultural subject or activity.

Radio materials should be entertaining and informative.

Radio is a communications medium whose primary objectives are to inform and entertain. Its formats accomodate

TIMELY RADIO MESSAGES BROADCAST IN THE LOCAL LANGUAGE

In Peru, the program "*Amanecer Campesino*" (*campesino* daybreak) was broadcast five days a week, at dawn, as farmers were waking up. The first thing they did was to turn on the radio as breakfast was made and they prepared their tools for work in the field. A similar program in Honduras was called "La Milpa" (a term Central American farmers use for the field where they grow their crops). Radio programs in Peru complemented graphic materials that were explained in the broadcast.

The subjects covered by the radio programs were broadcast according to the agricultural calendars used by the farmers for managing their crops. In the case of Peru, the "*Amanecer Campesino*" program was broadcast in Quechua, the local language. Initially, this decision was met with some opposition by the sponsors, who felt that it would be more "educational" for the farmers if the program were broadcast in Spanish. But the swift and total acceptance of the program not only caused continued use of the native language, it prompted other development organizations and even farmer organizations to follow suit.

the expectations of the listening audience precisely when messages are both entertaining and informative.

It is better to use a format based on dialogue than a talk given by a single individual lecturing into the microphone. A dramatization is even better than a dialogue format. And if that dramatization has a rural setting and uses familiar rural characters, so much the better. Music preferred by the farmers of the particular area should be used for background.

News programs are very popular in rural areas; farmers use the radio to remain in contact with events in the rest of the country and the world. A radio program can attract the target audience if it includes news formats. In rural areas, where mail is not a commonly used form of communication, radio is also a means of communication between and among groups and individuals. Incorporating this kind of message service into a radio program increases and maintains the audience and provides a genuine social service for farmers.

REFLECTING LOCAL REALITY OVER THE RADIO

In Peru, two permanent characters were created for the radio broadcasts. One was Don Hilaco, a mature and experienced farmer, still open to learning, who helped Juaneco, another farmer who was fearful of change and of trying new ways to manage his crops.

The farmers who listened to the program believed that Hilaco was actually an extension agent, so the scriptwriters gave him that identity, and he became a respected and credible source of information. Juaneco was a typical farmer, who, through his views and actions, reflected the fear and distrust of the farmers in the area, while expressing trust in the advice given him by the extension worker.

The dramatized way in which Don Hilaco and Juaneco treated farming matters and rural life, incorporating Juaneco's wife and other individuals from the community into the material as required by the script, made the program very popular and transformed its protagonists into heroes for the farmers. Farmers would come to the offices of the radio station to look for Don Hilaco as if he was a real person, to ask him for advice and invite him to their communities and holiday celebrations. One time, when word got out that Don Hilaco was in a particular community (because the individual who played the part of the character was also the producer of the program and frequently visited rural areas to evaluate and provide feedback on the dissemination of the messages), several hundred people congregated in the public square to listen to him and ask questions.

The radio program was not only an effective instrument for disseminating agricultural information and practices to the farmers, it also strengthened, in the eyes of the farmers, the role of the extension worker whose prestige was at a low point because of limited outreach capacity.

INTERPERSONAL MEDIA: GROUP TRAINING

Group methods are an effective means for extension agents and communicators to receive direct feedback from farmers on the technologies that they are asked to adopt, and also on the strategy to transfer those technologies. This is a basic step in the process of making adjustments to those technologies and strategies.

A TIMELY TRAINING EVENT DRAWS A MASSIVE RESPONSE

In the community of Recuayhuanca, in the highlands of Peru, several training sessions were held. One of them dealt with a subject requested by the community, the vaccination of cattle.

The farmers realized that their cattle were becoming ill with something that appeared to be quite contagious. They were aware of the symptoms of the disease, but they did not know how to control it and keep it from spreading. The coverage provided by the veterinarians assigned to the area, and by the extension agents from the livestock program, was quite limited, since the cattle grazed in fields located far from the community, under the care of the women and children. In addition, the farmers had been reluctant to vaccinate their livestock because of the expense.

The CTTA team prepared a training activity for the period when the cattle should be vaccinated against foot and mouth disease, which had been identified as a serious threat by the veterinarians working in the area. Together with the farmers from the community, the CTTA team set an appropriate date and time for a two-day training event. The first day would be dedicated to the theoretical

When to use group methods

There are three times when group methods are particularly useful:

- **Prior to beginning the agricultural cycle,** a series of group training activities held in communities or with organized groups of farmers serves to introduce the new behaviors proposed for managing the crop, and to determine, in collaboration with the farmers, their eventual acceptance or rejection,
- **At key times during the agricultural cycle** of a crop, the technicians determine when it is most advisable to call the farmers together to present a particular subject or provide a demonstration of techniques to resolve a production problem. The selection of the subject or technique will reflect the experience of the extension agents and the findings from the assessment.

aspects of the health and care of cattle; the second day would be dedicated to vaccinating the cattle and showing the farmers how to do it themselves.

On the day of the training activity, practically the entire community-not only the men but the women and children as well-met in the schoolhouse to listen to the veterinarians describe the diseases that could affect cattle and explain how to prevent such diseases with timely vaccination. On the following day, the community met once more, this time in a meadow located in the highlands previously selected as a site where all the cattle in the community could be brought together. Each family took its cattle to be vaccinated. Three veterinarians from the Experimental Station came to administer three different vaccinations; one of the vaccinations was given free of charge; the other two were provided at cost. The high demand almost exhausted the entire available inventory of vaccines.

Some of the members of the community practiced vaccinating their own cattle themselves. When they saw that it was not difficult, the community made plans to collect funds to purchase its own vaccination equipment. Neighboring communities requested that the same type of theoretical-practical training event be held for them when they heard about the activity and its success.

- **At harvest time** it is very important to review together with the farmers those factors that have contributed to a good or bad harvest. It is also possible to analyze which other technologies might be applied in the future to maintain or improve the production levels achieved.

Some considerations for handling groups

Punctuality and proper planning and organization are key factors in the success of a group training activity.

Nothing will develop more distrust and frustration in farmers than letting them down on a date set for a training activity. Farmers forgo working in their fields to receive what they hope will be useful advice for improved management of their crops. If these expectations are not met, their trust and belief in the organization will be lost.

If the setting for a group training activity is a demonstration plot where a particular technique is to be put into

practice, all of the necessary inputs should be in place and be present in the required amounts.

Group training activities must be evaluated and must represent opportunities for evaluating the various components of the strategy.

Some type of evaluation of group training, and of the learning acquired by the participants through such events, should be conducted. Group training activities are themselves a valuable instrument for evaluation and feedback on the progress of the transfer strategy.

In training events held at the beginning of the agricultural cycle, it is possible to test technologies that are to be promoted over the course of the cycle. These technologies can be analyzed with the farmers at this time to prevent any potential obstacles to their adoption; in addition, the views of the farmers can be incorporated into the strategy for transferring the technologies. This is also an appropriate time to determine the various stages of a crop cycle at which new training events involving specific aspects of crop management will be necessary.

In training activities carried out at key times during the crop management cycle, there is an opportunity to analyze,together with the participants,the progress achieved so far with the communications strategy: how messages are received and how they are understood and put into practice.

The training events scheduled at harvest time can be used effectively for evaluating the various technologies and the way in which the strategy was able to deliver them to the farmers.

Media integration

Group methods-training activities, demonstration plots, field days and method demonstrations-are not isolated activities; rather they are complemented and reinforced by other media.

Radio is a complementary instrument for:

- Advising farmers as to the date, time and place of a training event or field day, or for encouraging farmers to visit a demonstration plot by indicating the location and times at which techniques and practices will be demonstrated,

- Motivating farmers to attend training sessions and field days or method demonstrations,
- Reinforcing and providing follow-up to the learning received through group activities; reminding farmers of what they learned.

COMPLEMENTARY MEDIA PROVIDE MORE EFFECTIVE RESULTS

In Peru, the strategy consisted of a distance education system in which graphic materials dealing with each technology were explained to the users by means of radio programs. Both media were complemented and reinforced by means of theoretical-practical training activities held in the communities by extension agents with groups of farmers.

The printed material for this distance education system consisted of a graphic learning guide for each crop. The series of flyers, which had been produced and evaluated with researchers and farmers for each of the crop's technologies, was the basis for the guides' lessons.

The experience gained from the use of radio in the testing phase argued for two types of formats for the radio programs. An instructional format was used to explain the lessons contained in the guides. The other "reinforcing" format was a series that included interviews, drama, news reports and advice. These follow-up programs were produced using information gathered in the rural area concerning the doubts, questions and views of the farmers on everything that they were learning through the other media.

As a complement to this system, training calendars for groups of farmers were prepared in collaboration with the researchers for each crop. The graphic and radio materials also were used in training activities, further ensuring farmer understanding of their content and allowing feedback from the participants. Group training activities became valuable feedback mechanisms.

Extension workers continued their visits and demonstration plots. Their work was now much simpler as a result of the reinforcement provided by the other communications media.

Graphic material aids the farmers in:

- Reviewing and complementing the explanations provided by the extension worker or the individual in charge of the training event or group activity;
- Remembering the material learned and using it as a source of consultation whenever necessary.

Training activities are part of a global strategy. The material covered at training sessions must be reinforced by other media. In addition to the printed materials that are distributed to the participants, radio should be used to disseminate the content of training activities and to promote the participants themselves as resources for those unable to attend.

A **method demonstration** on a **demonstration plot** provides a valuable opportunity to gather opinions that can be disseminated then as endorsements. A field day is an item of interest to farmers that can be broadcast over the radio.

GENERAL RULES FOR PREPARING EFFECTIVE COMMUNICATIONS MATERIALS

The materials must be attractive.

What makes a particular communications material spark the interest of a farmer is its usefulness and its timeliness. In other words, its content must respond to a need for information when the farmer actually perceives such a need. But for that interest in the content to be transformed into a motivating factor for accepting and applying the content, the materials need to include other factors that will make them attractive to the users.

Educational materials normally used by development organizations in the rural sector are, as a rule, boring. Examples abound of text-filled brochures that discourage reading by the farmers, most of whom have had little schooling and are not accustomed to reading. There are boring talks on radio to which it is very difficult to pay attention.

Producers must use attractive elements, such as color and illustration in printed material, or music, humor and dynamic formats in radio. An illustrated brochure having the least possible amount of large-type text, and containing

concrete practical messages, will, without question, be better accepted and read and referred to more frequently than a complex text, printed in small type and saturated with theoretical information. A radio program that dramatizes a real-life situation experienced by the farmers will unquestionably be listened to with greater interest than a long radio talk given by a technician talking into a microphone.

The materials must transmit the message in an understandable way.

Once a piece of material has attracted the interest of the farmer, its message must be both understandable and useful to that farmer. There are many examples in rural areas of pamphlets dealing with a particular pest that devote three-quarters of the available space to an explanation of its physical aspects, reproductive process or life cycle, and only a minimal amount of space to a discussion of how to combat the pest. This discussion includes codes and formulas that are unintelligible for most farmers, with doses expressed in "ml." or "cc."

The first thing that any media producer should do is to "translate" the technical messages into the language of the farmers, using their own vocabulary and speaking their own language as necessary. In the case of radio broadcasts intended for bilingual areas, use of the local native language is a key factor in ensuring that messages are understood.

Understanding refers not only to the clarity of the content of a message but also to the way in which it is presented:

- Very small type can make a good piece of advice inaccessible,
- Complicated words can make the simplest advice incomprehensible,
- Too many ideas at once can confuse the farmer and distract attention from the key message the farmer needs.

Communications materials must make the audience identify with the message.

It is useless for the material to have sparked the interest of the farmers and for a message to have been understood if the farmers do not accept the message as their own. To ensure

that the farmers identify with the messages, communications materials should faithfully reflect the realities of their situation. The appropriate use of symbols and codes that the farmers themselves use to communicate makes it more likely that the messages will be accepted.

The use of familiar images-individuals, settings, instruments and tools-in graphic illustrations, local music and radio broadcast characters, is basic to making the farmers feel that they can identify with the communications materials. The use of personal testimonies from residents of the area, who are recognizable to others, is another key factor in farmer acceptance.

The messages must be acceptable to the farmers.

If a communication presents something, either in form or substance, with which the farmers do not agree, they will reject the advice given. Acceptance of a message has a great deal to do with its feasibility; if what is being advised represents a great risk for the farmers, they probably will not accept it. These obstacles can be overcome by modifying the technologies to be transferred.

Particular attention needs to be paid to the culture and characteristics of the farmers to avoid doing or saying something unacceptable or offensive. In producing communications materials for use in rural areas, it is common for the designers to make an incorrect assumption: *In an effort to reflect reality, farmers are shown as they actually are and not as they would like to be.*

When a low-income farmer is depicted faithfully in an illustration, the farmer does not accept it; moreover, such an image may even be discouraging. Farmers work hard to overcome difficulties and they prefer an image of themselves as they aspire to be. Therefore, depictions of farmers should use models of the best farmers from the group.

The messages must stimulate farmers to action.

Once the farmer's interest has been awakened and the message understood and accepted, the message should clearly establish what it is that the farmer is expected to do. The communication cannot simply inform and motivate; it *must be very specific in describing what is expected of the audience.*

Since farmers are being asked to change their attitudes and behavior, materials that contain generalities such as "for better production, use proper fertilization" do not help this process; they simply repeat something that the farmer already knows. What farmers need to know is the amount of fertilizer to use for a particular crop and how to obtain it inexpensively.

TESTING AND ADAPTATION OF COMMUNICATIONS MATERIALS

To test communications materials, they are submitted to a representative group of future users of those materials to determine whether the material will help them achieve the objectives for which they were produced.

The requirements for producing effective materials, as noted earlier in this chapter are:

- attractiveness,
- ease of understanding,
- user identification,
- user acceptance,
- action orientation.

Field-testing determines whether these elements are present in materials, and how to incorporate and reinforce them in the final production of that material.

What to test

The two primary elements of any communications material are content and format. Content refers to the message to be transferred and the way in which that message is organized in the material. Format is the presentation of the message and involves the graphic resources (in the case of printed materials) and auditory resources (in the case of radio materials) that are used to project that message.

When to test materials

Communications materials should be tested prior to final production. Testing is a continuous process, however. Each time a communications channel or medium is monitored to determine its effectiveness in transmitting a particular message to farmers, it is a form of testing. The experience

gained through continuous monitoring teaches communicators to reach farmers better and communicate with them more efficiently. An interactive monitoring process improves the effectiveness of each version of the communications materials.

Who should conduct the test

Testing should be carried out by the same individuals who produce the materials. The producers of the materials, whether graphic artists or radio producers, should be as objective as possible when testing their own materials. The test is **not** a criticism of their professional ability. As communicators, they must understand that even technically excellent materials are useless if the farmers do not understand or accept the terms.

How to test communications materials

The materials must be tested with a representative sample of the farmers who make up the target population for the technology transfer. A testing instrument, generally an interview guide, must be developed that contains specific questions about each of the five characteristics listed earlier as necessary for developing effective material. This instrument can be used individually-in the same way that a survey or interview is conducted-or in a group, using the focus group technique mentioned for the assessment.

When applying the test instrument, all of the responses given by the individuals being interviewed should be recorded. The interviewer should not give his or her own opinions or attempt to induce a response of any kind from the interviewees. In group tests, the tester should be sure that everyone participates and that opinions are not manipulated by anyone who has influence over the rest of the group.

Careful attention should be given to all audience suggestions for improving the material's form or content, such as the words they would use or the colors or music they would prefer. Farmers may see things and interpret information differently from those who produced the material. What moves farmers may not necessarily be the same things that excite the interest of graphic artists, technicians or radio producers.

Testing printed materials

For printed materials, test the graphics and text separately, then together. With a poster, *for example,* the illustration should be tested first (with the text covered), then the text (with the illustration covered) and, finally, both elements together to see how they complement each other.

In testing graphic materials, use clear photocopies of the designs. If the materials are to be in color, color the photocopies with colored pencils and markers so that they look as much as possible like the intended design.

Ask questions about the effectiveness factors:

Attractiveness

- What do you like most about the drawing (or photograph)?
- What do you like least? Why?
- What do you think about the colors that were used?

Understanding

- Describe in your own words what you see in the drawing or photograph.
- Explain what you think is happening in this scene.

Involvement or identification

- Do the persons or objects in this scene represent those that you might find in your own community?
- Are the clothing, tools and other elements shown here like those used by people in your community? If not, how are they different and what should be changed?

Acceptance

- Is there anything that bothers you about what you see in the scene, or anything with which you are not in agreement? If so, what and why?

If the farmer can read, the illustration should be covered leaving only the text visible. The farmer's difficulty or ease in reading and comprehending the content will indicate any changes needed in the wording. Reading difficulty may be related to the size of the type. Likewise, comprehension can depend on the use of certain words and

A MESSAGE MORE TO THE LIKING OF THE USER

A draft poster dealing with the benefits of fertilization showed a drawing of a successful farmer who had followed the advice given in the text of the poster. The farmer was shown in the middle of a field, surrounded by strong healthy corn plants. The text was as follows: **Fertilize your corn and you will have better harvests.**

During the process of testing the poster, farmers were asked why they would be inclined to fertilize their corn. The most frequent response was "to be able to harvest more and earn more money."

To reflect more faithfully the motivating factor for fertilizing indicated by the farmers, both the drawing and the text of the poster were modified to show a smiling farmer next to a pile of harvested ears of corn. The new text read: **I fertilized my corn and made more money than before.**

the degree of conciseness or complexity with which the message has been formulated.

The first step involves asking the respondent to read the text to determine its level of difficulty. Special attention must be given to those words that the farmer has difficulty reading or pronouncing. The farmer is then asked to explain the meaning of what was read to determine whether the content has been understood.

After the text has been evaluated, the complete graphic is shown. The analysis now proceeds to the relationship between the illustration and the text, and how that relationship is perceived by the respondent.

When the drawing and the text are shown together, the following questions are asked:

- Do you think the drawing adequately illustrates the message?

If the respondent answers no, ask:

- What scene would you use to better illustrate this same message?

Stimulating action

Finally, the test aims to determine whether the graphic moves the farmer to act as intended. For this, ask the following questions:

- What does the message tell you to do?
- Are you willing to follow this advice? Why? If not, why not?

After these questions have been asked, try to determine exactly which aspect of the material motivates the farmer. If most of the respondents mention motivating factors other than those presented in the material, it would be wise to change the message to one that better reflects the factors mentioned by the respondents.

Printed materials with large amounts of text require special testing. The capacity of these materials to answer the farmer's questions has to be evaluated. This test can be conducted in two ways:

1. Photocopies are made of the draft material and then delivered to a number of farmers. The farmers are asked to read and analyze the material and are told that the next day someone will return to ask them some questions about the material. The following day, the testn team interviews each farmer about key aspects of the form and substance of the material. The team assesses whether the farmer has been able to find the information needed to perform the expected behavior.
2. Another form of testing involves assembling a group of farmers and giving each one a copy of the material. The test team then analyzes the content of each page, both graphics and text, with the group. The farmers' comments on their ease or difficulty of understanding the messages and following the instructions in the material are recorded. The comments should reveal whether the messages are easy to understand and whether the instructions and their sequence are easy to follow. All members of the group should have an opportunity to express their opinions.

In either case, it is necessary to prepare a guide for the questions, based on the content of the material, with emphasis given to the major points.

Testing radio materials

As in the case of printed materials, the testing of radio materials can be performed individually or in groups. A radio spot, *for example,* may be tested with individual farmers since the material is brief and many farmers can be interviewed in a short period of time. A radio program may be tested with individuals, but because of its length it is more practical to test it with groups of farmers.

When evaluating radio materials, it is important to analyze not only the content but also whether the format and presentation attract and keep the listeners' attention. It was noted earlier that competition for audience attention is high in radio. To evaluate the effectiveness of radio materials, respondents are asked to listen to the materials once, then are asked the following questions:

Attractiveness

- What do you like most about this program (or spot)? What do you like least?
- How could this program (or spot) be improved?
- Do you like the music that is used? Would another type of music that might be better?

Understanding

- What is the central theme of this program (or spot)?
- What do you remember about the program? (At this point, specific questions are asked to determine whether the audience grasped the key messages.)
- What part(s) of the program did you not understand?

Involvement or identification

- To whom do you think the advice given in the program is directed?
- Do the people in the program talk the same way that people in this area do? Why/why not?

Acceptance

- Is there anything in the program that you do not agree with? What is it, and why?

THE STRATEGY IS REFOCUSED AND ADJUSTED CONSTANTLY

In Peru, in the initial phase of strategy implementation, plans called for promoting the technologies by means of posters, flyers, radio spots and programs. Posters were ruled out because of their high cost and difficulties in using the resources of the local office. Also, the time required for production and printing made timeliness a major concern.

In this phase, the technologies were promoted by the extension agent working directly with groups of farmers. This direct promotion effort was reinforced with simple flyers for each technology, in which the steps for applying the technology were spelled out, and by spots and radio programs encouraging farmers to test the technologies and providing a rationale for their adoption.

Direct promotion to groups of farmers made it possible to study the ease or difficulty of each technology's adoption and application and to define a number of specific ways in which the technologies should be modified and presented. The messages became increasingly more focused and key points were identified for reiteration.

Simple graphics, such as the flyers, made it possible to identify the visual codes that were most understandable to the farmers. The type of illustration, the typeface used and the layout of the graphics and text were evaluated. When one of these flyers was handed to a farmer or distributed to a group of farmers, they were asked what they understood best or what they did not understand.

The distribution of flyers made it possible to identify and test distribution channels to ensure that future production of more expensive graphic materials would not be wasted or lost to inefficient channels. The spots and radio programs helped to make radio characters familiar and acceptable and to identify the most appropriate radio formats and approaches. From this experience, radio programming increasingly incorporated the use of Quechua until eventually all broadcasts were made entirely in that language.

The preparation and testing of materials in this phase made it possible to progressively create instructional formats that were appropriate, and to explore together with the farmers the feasibility of using other media, such as group training.

Stimulating action

- What does the program say to do?
- As a farmer, would you agree to follow the advice given?
- Why would you be inclined to follow (or not follow) this advice?

The radio material is then played once more and an open-ended discussion on the program content and format is held. Care must be taken to ensure that notes are taken of all suggestions and recommendations made by the respondents on ways to improve the material.

When testing radio materials, it is useful to record the spot or program twice on the same side of the cassette. In this way, it is not necessary to rewind the tape to listen to the material a second time.

THE PROCESS FOR TESTING THE COMMUNICATIONS COMPONENTS OF TECHNOLOGY TRANSFER

One way to ensure greater impact for the communications strategy is to break it into two phases. Transfer in both phases, but the first phase tests the components that will be used in final form and at full scale in the second phase.

The objectives of the first phase are to determine, when adapting the technology, the best communications media and the most appropriate formats for the transfer, as well as to identify the distribution channels to efficiently deliver the communications materials to the greatest number of farmers.

In the first phase, emphasis should be given to interpersonal work with the farmers to promote the selected technologies, reinforced by simple, low-cost radio and graphic materials. This first phase is used to evaluate acceptance and management of those promoted technologies with the farmers who initially adopted them, It also provides feedback to the researchers so that they can make any necessary modifications to the technologies.

Interpersonal work with the farmers during this phase enables illustrators and radio producers to become familiar with the behaviors, ideas, vocabulary, types and characters involved in the agricultural activity. This experience will guide the design and production of educational materials.

This interpersonal phase will determine which codes or symbols farmers understand and which channels and formats are most appropriate. The initial communications materials should be low cost. Continuous evaluation of these materials during the initial phase will provide the information and experience necessary to produce more complex and costly materials during the second phase. Because of the careful first-phase testing of low cost materials, the second-phase materials will be more certain to reach their intended mass audience.

CHAPTER SUMMARY

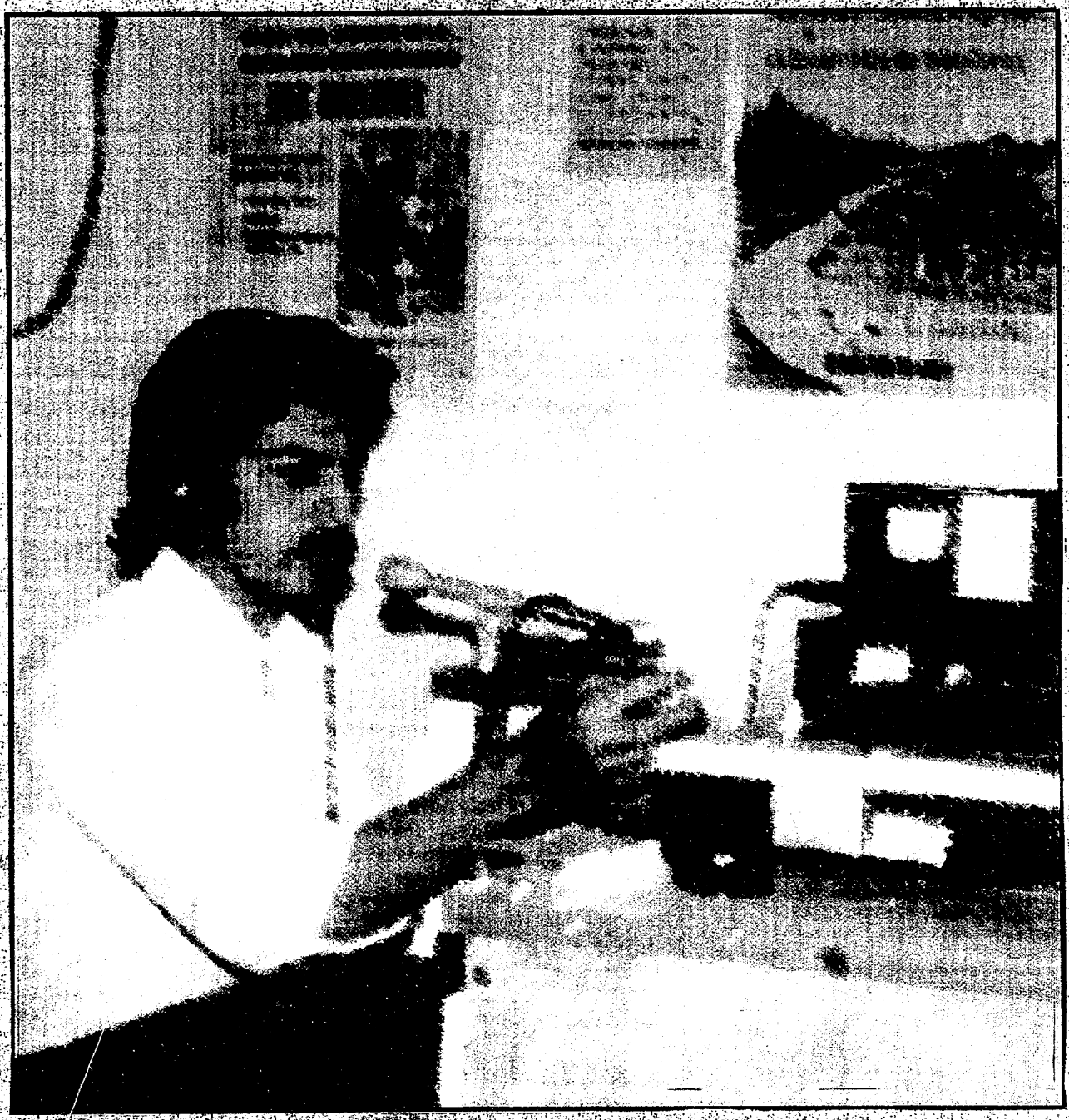
Communications materials, regardless of their medium, should satisfy a series of conditions if they are to effectively transmit their messages effectively:

- They should be attractive,
- They should be understood by the target audiences,
- The target audience should be able to identify with the materials and feel that the message being transmitted is relevant to them,
- The materials should be acceptable to the target population, both in form as well as in content,
- The materials should stimulate the target audience to take concrete actions within the framework of the transfer strategy objectives.

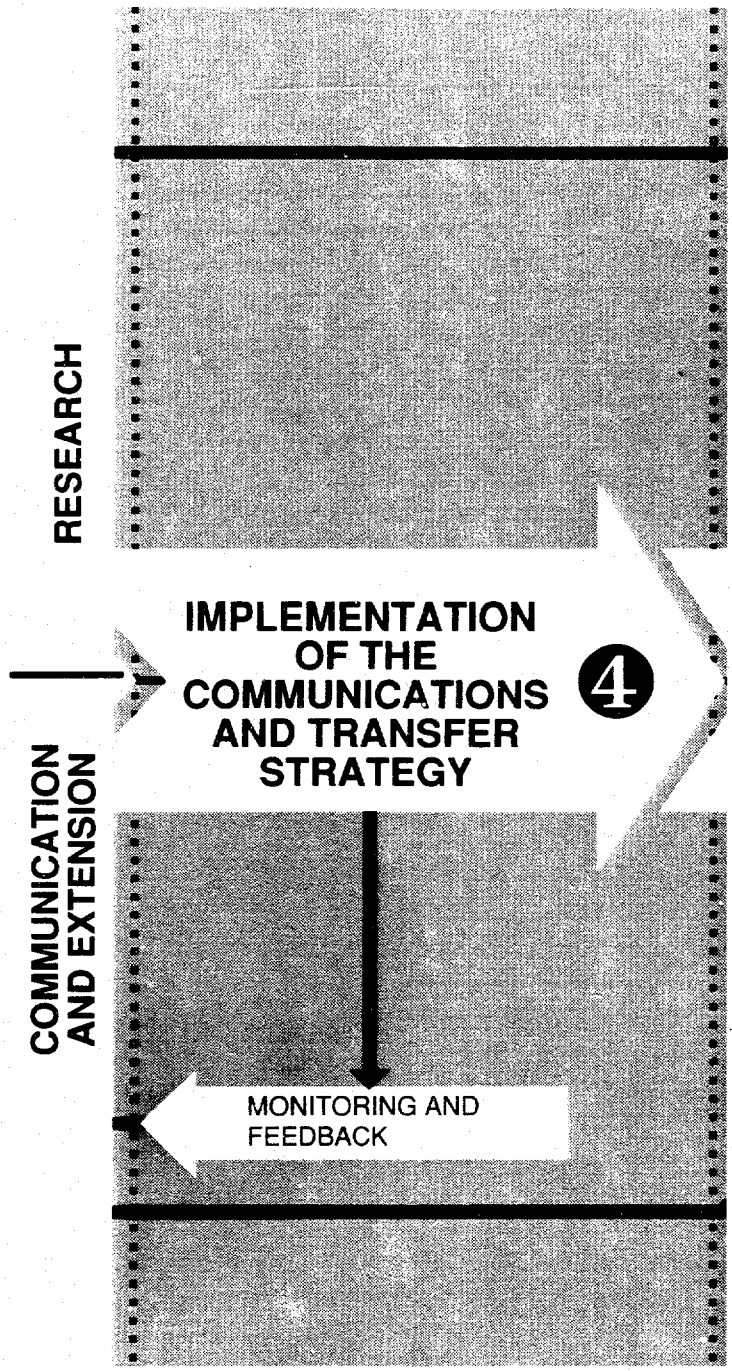
Materials produced following these criteria must be tested with a representative sample of the population for whom they are intended, to determine if the above conditions have been met and, if not, to make the corresponding adjustments. The overall communications strategy for technology transfer and each of its individual components also must be tested and adjusted to ensure their integration and effectiveness.

CHAPTER VI

Step 4
Implementation of the Communications Strategy: Disseminating the Technology at the Right Time in the Production Cycle



THE CTTA METHODOLOGY



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INTRODUCTION

Implementing the communications strategy requires organizing and managing various strategy components efficiently. The focus is on using these components to achieve the greatest possible coverage in the dissemination of messages. It is assumed that if the technologies are appropriate, and if the messages are designed taking into account the characteristics of the target audiences, the delivery of those messages in a timely fashion to the greatest number of farmers will lead to a significant rate of adoption of those technologies.

A well-trained staff plays an essential role in the success of the communications strategy. Staff should be trained not only in their own functions but also in the overall strategy, so that each person will be able to work in coordination with the other members of the staff. Thus, a radio producer must learn not only how to produce better radio programs, but also about the individual technologies and what the farmers' results are. Coordination among the members of the work team also depends on good leadership.

The proper functioning of all of the different components of the strategy is ensured through a continuous monitoring process that allows for necessary adjustments and develops the feedback so necessary for decision making.

STAFF TRAINING FOR STRATEGY IMPLEMENTATION

Implementation of the communications strategy begins with training of the extension workers, and all other staff members involved in the strategy, in the technologies to be transferred. The primary objective of this training, which is conducted by the researchers and personnel responsible for the transfer program, is to consolidate knowledge about the technology so that all those involved in the transfer process will transmit the same information and advice. All the personnel involved in strategy implementation should have a thorough knowledge of the kinds of materials that will be developed for the farmers, as well as the characteristics of those farmers, so that they will be able to deliver the strategy effectively.

To give extension workers the technical information they will need at a later stage, researchers should prepare manuals on the proper management of each crop, which contain all of the technical recommendations to be trans-

ferred. These manuals are given to the extension agents working in the area and, in addition, serve as the source of technical information for the personnel charged with designing the messages and graphic materials to be disseminated.

All individuals involved in the strategy implementation should receive training on the results of the assessment. These results should be analyzed for their impact on the objectives and components of the strategy to be implemented. It is essential that all communications personnel have a thorough knowledge of the recipients of the strategy, in this case the farmers toward whom the technologies are targeted.

Personnel in charge of the production and handling of communications materials also should be given training. Such training should be theoretical-practical and, to the extent possible, should be combined with the strategy implementation process. *For example,* practical exercises in radio production should be aimed at producing the specific programs required for implementation of the strategy, and so on.

CONDITIONS FOR EFFICIENT STRATEGY IMPLEMENTATION

One of the basic characteristics of a communications strategy for agricultural technology transfer is flexibility. The strategy should be capable of adapting to any changes that might occur or to any new problems that might arise.

There are three key factors in the development of the communications strategy that will ensure the effectiveness of that strategy:

1. **The timeliness of the messages.** The first requirement for sparking the interest of the farmers in the technologies to be transferred is that such technologies must be delivered in a timely fashion. The timeliness of the message is the result of proper planning. As noted previously, planning is necessary to establish the order in which the messages are disseminated, based on the agricultural calendar of the crops. The calendar also governs the production schedule for the educational materials, to ensure that they are produced on time.
2. **The greatest possible coverage.** Once useful and appropriate technologies and planning are in hand, the next step involves ensuring the delivery of those technologies to the greatest number of farmers.

Broad coverage is the result of proper selection of communications media and an appropriate system for distributing educational materials.

3. **The effective and continuous monitoring** of how the various components of the strategy are working to keep the strategy well focused. This monitoring process provides systematic feedback about farmers' responses to the materials disseminated and to the technologies themselves.

A characteristic of the CTTA approach is systematizing technology transfer into a perfectly defined sequence of actions. This involves establishing a number of operating mechanisms that should be strengthened continuously. These mechanisms and the ability of the staff to manage them form the basis for institutionalizing the working methodology.

TIMELINESS IN MESSAGE DISSEMINATION

The technologies selected for transfer should reach the farmers at those times when they are to be applied to their crops. If the technologies arrive too soon, there is a risk that the farmers will not be able to recall the messages when they need them. If they arrive too late, it may frustrate the farmer, who will not be able to remember the messages during the next agricultural cycle. Timely dissemination of the messages greatly promotes adoption of the new or improved technologies.

Establishing a calendar for the messages

An initial step for ensuring timely dissemination of messages is to plan the dissemination to fit the growing cycle of the individual crops. The messages for each technology should be disseminated at the point in the agricultural calendar when the problem to be addressed by the technology actually occurs. (*See the sample calendar below.*) The time period apportioned to the various messages is carefully planned.

To determine when to disseminate the various messages correctly , an efficient system of feedback from the field that relays what is going on there is needed. The schedule of messages and any updates should be communicated to the extension workers so that they can take the schedule into account when programming their activities.

MESSAGE CALENDAR

Messages disseminated in the area of Huaraz, Peru, follow an activity schedule based on this agricultural cycle.

MONTH	SUBJECT
July	Basic problems in growing corn Importance of crop rotation How to prepare the land for growing corn Fertilizer dose for corn in the area
August	Basic problems in growing potatoes Correct distance to be observed in planting corn How to fertilize corn during planting How to prepare the land for growing potatoes How and when to hill corn
September	Correct distance to be observed in planting potatoes Fertilization of potatoes during planting Irrigation and fertilization of corn How to combat worms affecting corn How to combat the *gusano cogollero* affecting corn

The topics for each month are programmed according to the agricultural activities that take place.

Establishing the communications calendar and production schedule

The work team should use the message schedule to establish the production schedule for the various materials required for each communications medium in the strategy. Beginning with the date on which the message is to be disseminated and working backward, the work team establishes the time periods for materials production. These stages are, from last to first, as follows:

- Dissemination
- Delivery of graphic materials to the distributors and radio materials to the radio station
- Final production: printing or recording
- Modification of materials according to test results
- Field-testing materials
- Design of radio and print materials

TIMELINESS: THE KEY TO EFFECTIVENESS

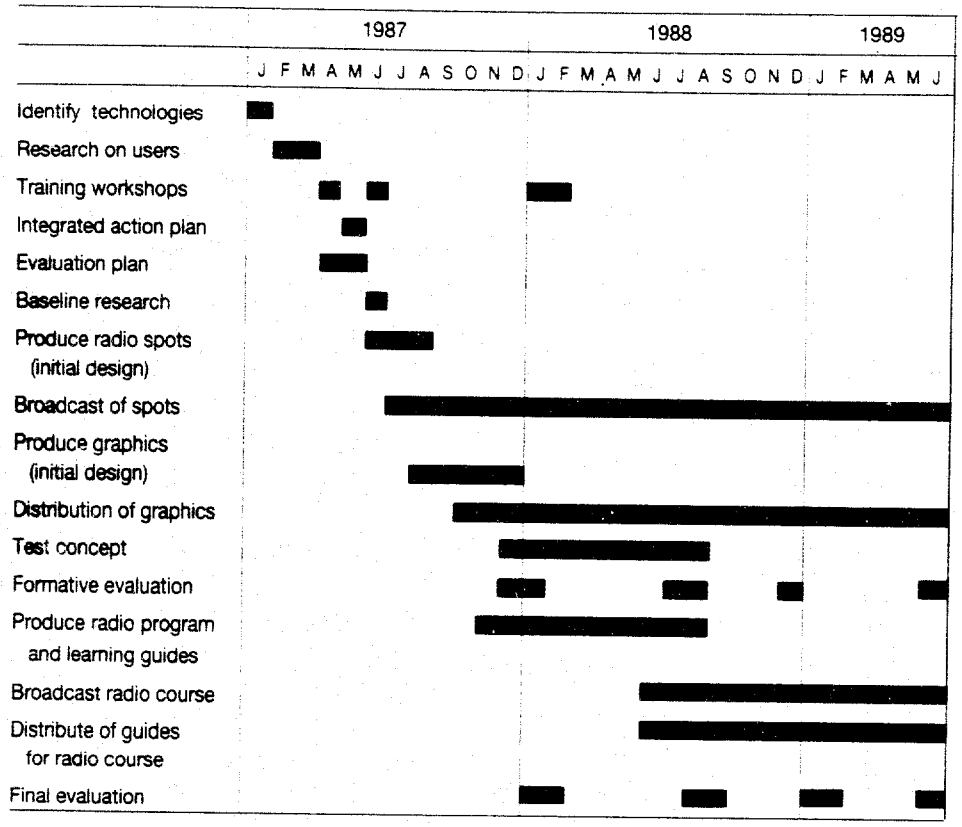
If farmers are to be taught how to control a pest, the dissemination of messages on this subject should be planned for that time when the pest first appears and begins to attack the crop. These messages are then scheduled to fit the times when specific action or information is needed. *For example*, to control a pest, farmers should be able to:

- Identify the pest and the damage it causes;
- Assess the degree of infestation of the crop and determine the most appropriate time to begin control measures;
- Be aware of the biological, mechanical, or chemical alternatives for controlling the pest;
- Properly implement the control measures.

Obviously, the messages dealing with the first two subjects should be disseminated at the time the pest normally begins to appear in the area. Then, when control measures are to be applied, the messages dealing with the next two subjects should be disseminated. By that time, steps should have been taken to ensure the availability in the area of the inputs necessary for applying the technologies. The farmers should also be given guidance as to where they can obtain the inputs, along with an indication of their price.

This schedule is especially necessary in the case of graphics, as production tends to be more lengthy than in the case of radio material (*See the sample timetable, next page*).

CALENDAR OF ACTIVITIES



GETTING THE GREATEST POSSIBLE COVERAGE

Reaching the greatest possible number of people in the target audience depends on efficient management of the media selected. It is assumed that the media selected are the most appropriate ones for reaching the farmers, as determined by the assessment activity. It is now time to make the best use of their respective advantages. Mention has already been made that diverse media should be used in a complementary fashion. Depending on its characteristics, each medium should support the other media in the dissemination of the each message.

Radio

The times at which the spots or radio programs are to be broadcast should be clearly set. This schedule should be adhered to strictly by the radio station.

PROPER ORGANIZATION PREVENTS CONFUSION

In the pilot zone in Peru, during the first implementation stage of the communications strategy, a work plan called for project personnel to develop communications materials and test them in the field, prior to later production.

As a rule, community authorities would meet on Saturday mornings. Project personnel took advantage of this opportunity to distribute flyers for the following week so that the authorities could distribute them, in turn, to the farmers. Consequently, educational materials had to be ready every Saturday. The work schedule for each week was as follows:

Monday: Analyze the technology to be transferred and the corresponding messages. (On this day, project personnel would determine with the researchers and communicators how the messages, approaches and formats were to be programmed. The technologies and messages had already been decided in the strategy's design phase.)

Tuesday: Design flyer and radio spots. Write script for radio programs.

Wednesday: Test flyer and radio spots in the field on a number of different farmers.

Thursday: Final design of flyer and spots, based on the results of the field test. Review of program scripts based on these same results.

Friday: Reproduction of the flyer and final recording of spots and radio programs.

Saturday: Distribution of flyers to the *campesino* communities' authorities, and of the spots and radio programs to the local radio station.

Dissemination of the messages would begin on Monday of the following week. Beginning on Tuesday, staff would visit the farmers to discuss and evaluate the radio messages and flyers with them. At the same time, the subjects to be covered the following week were discussed. The evaluation of the flyer served to improve the design of the next one. Comments received on the technologies were discussed with the producers of the radio programs and immediate responses were broadcast in the programs.

How to establish a radio broadcast schedule

The idea is for the messages to "seek out" the target audience at times and places affording the most exposure. The scheduling of message broadcasts is based on knowledge of the users' activities during the day: what time they begin their day, what time they leave home to work in their fields and what time they return. Based on this knowledge, the messages can be distributed appropriately. (*See the sample schedules.*)

Graphics

When producing graphic materials, the time needed for field-testing the designs must be taken into account. To achieve appropriate coverage with graphic materials, efficient distribution channels need to be established and coverage strengthened through the use of other media.

EACH PIECE OF ADVICE HAS ITS TIME

In Peru, it turned out that a good time to broadcast recommendations on farming over the radio was early in the morning, when the farmers had not yet left home to work in the field. If the message was pertinent, they could test it when they got to their fields. Another appropriate time was when the farmers returned from their farm tasks at the end of the day. They could hear explanations in the broadcasts for problems that they had encountered that day in the field.

The experience acquired during the initial stage in the highlands of Peru indicated that farmers were very interested in the morning messages that related to crop cultivation: preparation of the land, irrigation, hilling and fertilization. The reason appeared to be that upon rising, farmers tended to plan their day's activities, which included these kinds of work.

However, the messages relating to pests and diseases seemed to be better received in the afternoon, when the farmers returned from their fields. The reason appeared to be that, in carrying out their morning activities, they would notice pest attacks, and in the afternoon would discuss with family members the purchase of products to combat those pests. This would lead them to plan to devote the following morning to purchasing the products in town.

BROADCAST SCHEDULE FOR THE "*AMANECER CAMPESINO*" RADIO PROGRAM IN PERU

MONTH: AUGUST
TIME: 5:30 a.m. to 6:00 a.m.

DAY:	PROGRAM TOPIC
1	Selection and disinfection of potato seed
2	Review potato seed selection
3	Selection and preparation of the land for growing potatoes
4	Review preparation of the land
5	Review topics covered on days 1 and 3
8	Planting corn (distances and fertilization)
9	Review distances in planting corn
10	Planting potatoes (distances and fertilization)
11	Review fertilizing potatoes during planting
12	Review topics covered on days 8 and 10
15	Cultivation practices in potato production (hilling)
16	Review material on hilling
17	Planting potatoes (distances and fertilization)
18	Planting of corn (distances and fertilization)
19	Review topics covered on days 17 and 18
22	Cultivation tasks for corn (irrigation, hilling and weeding)
23	Review hilling corn
24	Controlling corn pests (worms and *gusano cogollero*)
25	Review controlling worms
26	Review controlling *gusano cogollero*
29	Livestock raising— vaccination of cattle
31	Livestock raising— parasites in cattle

FIND BROADCAST TIMES THAT ARE CONVENIENT FOR THE FARMER

During the initial stage of the strategy in Peru, six radio spots were broadcast daily. Two of these spots were scheduled very early in the morning (generally between 5:00 and 5:30 a.m.), two more between 3:00 and 4:00 p.m. and the remaining two between 6:00 and 7:00 p.m., when the farmers were preparing to go to bed. This ensured that even though there were few slots, the messages would be heard several times by the target population.

BROADCAST SCHEDULE FOR SPOTS ON "RADIO ANCASH"— HUARAZ, PERU

MONTH: AUGUST

DAY	TIMES	TOPICS
1	1:00 p.m.	Size and appearance of good potato seed
	1:30 p.m.	Disinfection of potato seed
	2:00 p.m.	Size and appearance of good potato seed
	5:00 p.m.	Size and appearance of good potato seed
	5:30 p.m.	Disinfection of potato seed
	6:00 p.m.	Size and appearance of good potato seed
2	1:00 p.m.	Disinfection of potato seed
	1:30 p.m.	Size and appearance of good potato seed
	2:00 p.m.	Size and appearance of good potato seed
	2:30 p.m.	Disinfection of potato seed
	5:00 p.m.	Size and appearance of good potato seed
	5:30 p.m.	Disinfection of potato seed
	6:00 p.m.	Size and appearance of good potato seed
3	1:00 p.m.	Number of passes required for turning the soil
	1:30 p.m.	Why crop rotation is important
	2:00 p.m.	Number of passes required for turning the soil
	5:00 p.m.	Why crop rotation is important
	5:30 p.m.	Number of passes required for turning the soil
	6:00 p.m.	Number of passes required for turning the soil

It is difficult to identify the most appropriate channels for distribution of graphic materials. The use of the farmers themselves as distributors does not generally work, as it requires time and effort, both scarce resources for the farmer.

The key to distribution can be taken from marketing: establish fixed distribution points and promote those points and the materials to be distributed by stressing that the latter will be made available without charge. In this way interested farmers can be persuaded to go and retrieve the materials themselves.

These distribution points can include the home of a farmer living equidistant from neighboring farmers, the school, the town hall, the agricultural supply outlet, or other appropriate places. They should be publicized over the radio so that the farmers will know that they can find specific free materials at these points.

In a parallel effort, other distribution channels, such as group training sessions or individual visits by extension workers, can be used. If farmers are told that they can ask the extension worker for particular materials, they will request materials whenever they meet, without the extension worker having to seek out the farmers one by one to deliver the material.

MONITOR DISTRIBUTION CAREFULLY

In the pilot zone of Marcará, Peru, several different distribution channels were tested. It was first thought that the extension worker assigned to the area could distribute the materials to the farmers, but coverage was limited and distribution to individual farmers was very slow. It was then decided that a quantity of the materials would be distributed to key farmers, well known to the extension worker, for subsequent delivery to their neighbors. However, this formula also failed: the farmers had no time for distribution activities and tended to keep the materials for themselves or for their closest friends.

Tests were run using community authorities who received a supply of materials for distribution in their communities. Monitoring indicated that the materials were not reaching the farmers through this channel. Supplies of graphic materials were delivered to particular stores where the farmers would go, but successive visits confirmed that the materials were being used to wrap products for sale.

Finally, a decision was made to use a different approach, putting the burden on the farmers to pick up the materials. Thus, the radio programs advised the farmers as to when community authorities would have materials available and the topics covered in them. In addition, they could pick materials up at the office of the extension agent or request them from project personnel on field trips.

Interpersonal communication: visits, group training sessions and demonstration plots

Visits to farmers by extension workers should follow a schedule that can be supported by other media. Radio broadcasts can inform the farmers in the area about the particular schedule of activities of each extension worker, who can then be reached when needed. Extension visits to the communities should be announced over the radio, with farmers encouraged to go as a group to obtain advice.

Training sessions by researchers for groups of farmers in the communities should be planned ahead of time with the researchers giving the presentations. Such training sessions should be promoted over the radio, inviting the greatest possible number of farmers to participate.

MONITORING: TRACKING THE COMPONENTS OF THE STRATEGY

Constant vigilance over the application of the communications strategy is a primary requirement for ensuring its effectiveness. This vigilance is termed monitoring. The results that it produces make it possible to adjust the strategy as the project proceeds and to accommodate any variation from the assessment findings.

As was discussed previously, the assessment provides information on agricultural problems, on the technologies that will help to overcome those problems, on the target population to which the technologies will be proposed, and on the most appropriate media for delivering those technologies. All of these elements, which together make up the constituent components of the transfer strategy, are dynamic in nature and change as the strategy evolves. For this reason they should be reviewed continuously, and the strategy adapted to accommodate changes in those elements.

Monitoring makes it possible to keep the assessment up to date on which decisions are made as activities develop and changes occur. Monitoring demands constant interaction among the many actors involved in the process: researchers, extension agents, communicators and farmers. The most effective channels for this interaction are joint work in the field, constant consultation with the farmers and feedback to the researchers.

Monitoring the evolution of problems and constraints

The needs and expectations of farmers, as well as their production problems, should always be reviewed to determine:

- how problems affect different farmers, to constantly modify audience segmentation; and
- how existing problems are dealt with or how new problems appear, to review the validity or timeliness of the technologies.

Monitoring the application of the transferred technologies

One of the most important reasons for monitoring is to adapt the technologies continuously, as they are transferred, to the characteristics and capabilities of the farmers. Monitoring is used to analyze:

- The ease or difficulty of applying the technologies for different types of farmers-what obstacles exist to their practical application and how such problems can be overcome. This information assists the researchers in modifying and adapting the technology if necessary, or in better explaining through the media how to put the technology into practice.
- Timeliness within the calendar cycle for each crop-Is the technology offered at the precise time that it should be applied? This information is useful in adjusting the broadcast schedule and ensuring the timeliness of messages.
- Which technologies are most easily adopted and which produce greatest resistance. Those technologies receiving greatest resistance should be reviewed once again with the farmers to reduce the perceived risk of their application, and to modify and adjust them if necessary.
- Usefulness and effectiveness of the technology in overcoming the problems identified-does application of the technology give the expected results?

Monitoring provides feedback to researchers so that, if the technologies are not working, they can be retested to determine in which agroecological areas they are most

effective, how they need to be additionally modified to increase ease of use or which new technologies can be provided to replace them.

Monitoring the farmers' ability to follow advice and instructions

The following points should be covered by an effective monitoring system:

- Farmer ability to understand and put into practice the technologies as proposed. This allows ongoing adaptation of the technologies to the capabilities of the farmers.
- The priority of problems-whether those listed in the assessment are maintained or changed. This allows for modification in the schedule of topics to address in dissemination.
- Farmer understanding of the codes used in the communications materials: graphics, text, sequences, language. In order to design and produce more effective communications materials, adjustments can be made to reflect the farmers' way of perceiving and understanding.
- Changes in exposure to communications media-whether farmers keep the same level of radio use, *for example.*

Monitoring of the coverage provided by each communications medium, the systems for distributing printed materials, and participation in training activities should also take place . The decision on how to integrate the media, or how to complement each medium with the inherent strengths of the others, depends on the feedback provided by monitoring.

Monitoring the effectiveness of the media selected for the strategy

- The ability of each medium to reach the greatest possible number of farmers.
- The ability of each medium to transmit the message to the farmers in an effective, understandable way.

Monitoring other variables in the process

Monitoring should also be used to review other variables involved in the production process, such as:

- The accessibility of inputs in the area; *for example,* whether the recommended pesticides, seeds or fertilizers are always available to the farmers.
- Changes in agricultural policies, such as the extension of credit to promote the production of a particular crop at any given time.
- Fluctuations in prices and markets for the crops covered.

How to monitor strategy implementation

Monitoring of actions is a work method, but at the same time it should be a permanent attitude of those involved in implementing the strategy. This means that on the one hand, monitoring of the strategy should be systematic, tracking certain objectives in each component. But at the same time, monitoring occurs with each visit made to the field during implementation. All monitoring information should be recorded and reported to the team at periodic planning meetings.

Monitoring radio dissemination of messages begins with the broadcast schedule. From this schedule, slots or times are selected at random to listen to and to check whether material is being broadcast as planned. It is also important to ascertain whether contradictory or conflicting messages have been broadcast immediately preceding or following the strategy messages.

With a simple radio receiver, anyone in the communications office can monitor radio slots that are broadcast during office hours. The radio operator or announcers can assume responsibility for monitoring the radio program to ensure that it is broadcast at the scheduled time, without interference from noise or technical problems.

Reception of the messages by farmers is monitored by asking them questions during field visits. Monitoring the distribution of graphic materials involves a similar process. Project personnel who see farmers daily should ask them about the materials.

Observation is the most useful technique for monitoring the application of technologies. Observations on such things as the density of planting, the condition of the plants

EFFICIENT MONITORING TO REACH MORE PEOPLE

In Marcará, Peru, when the radio program was already very well known and accepted among the farmers, one of the *campesino* associations purchased the broadcast slot immediately preceding the program to take advantage of the coverage attained by the program. During some of the association broadcasts, certain technical assistance activities were harshly criticized, which occasionally influenced the attitudes of farmers who listened to the CTTA Project program broadcast immediately afterward. As a result, visits were made to association authorities and an agreement was reached whereby the association would always be informed of the technical content of the CTTA program. Print materials covering those messages would be provided to them so that they could disseminate them simultaneously.

Distributors of chemical products also began to advertise in slots preceding and following the program, which created confusion among the farmers as to whether the program was recommending these products. Project personnel negotiated an agreement with the radio station not to allow this type of competition, which seriously undermined the social objectives of the program.

The producer of the radio program reported that the early-morning program was being broadcast fifteen minutes late. As a result, part of the audience was lost, since the farmers, who go everywhere on foot, left their houses very early in the morning and did not wait for the broadcast. They assumed that the delay meant the program had been canceled. When a complaint was submitted to the radio station, the owner could not understand how a difference of fifteen minutes before or after the scheduled time could be of any importance. When it was explained to him how this difference was responsible for the loss of a portion of the audience, the program was broadcast on time.

and pest attacks show how technologies are being applied, and if problems are developing. The ease or difficulty of an application can be evaluated by the farmers themselves while they are applying the technologies. (*See the "Sample Observation Guide" in Chapter IX.*)

APPROPRIATE MANAGEMENT AND PROCEDURES FOR ADMINISTRATING THE STRATEGY

Implementation of the strategy, monitoring of the various strategy components and continuous feedback to those responsible for the program require a staff equipped with management capabilities and clearly defined operating procedures.

The steps to be followed in producing radio and materials should be clearly established: who will design, who will review, who will approve. Regular field visits should be scheduled, based on the size of the area, for balanced coverage. At least once a week, the work team should meet to prepare the calendar of topics and messages for the following week and should organize production, dissemination and monitoring activities.

Strong coordination links should be established among communicators, researchers and extension agents. The technical content of all communications materials shouldbe reviewed with the researchers before the materials are produced in final form; it is also necessary to consult with the researchers on all feedback from the field about how the technologies are working, and any modifications they may require. The researchers should be responsible for the on-going training of extension agents in the technologies and, to the extent possible, they should also participate in group training events for farmers. The extension agents assigned to the area should participate fully and actively in the implementation of the strategy. Joint field visits, materials distribution, and direct technology transfer activities based on traditional extension methods should be coordinated with the extension agents.

CHAPTER SUMMARY

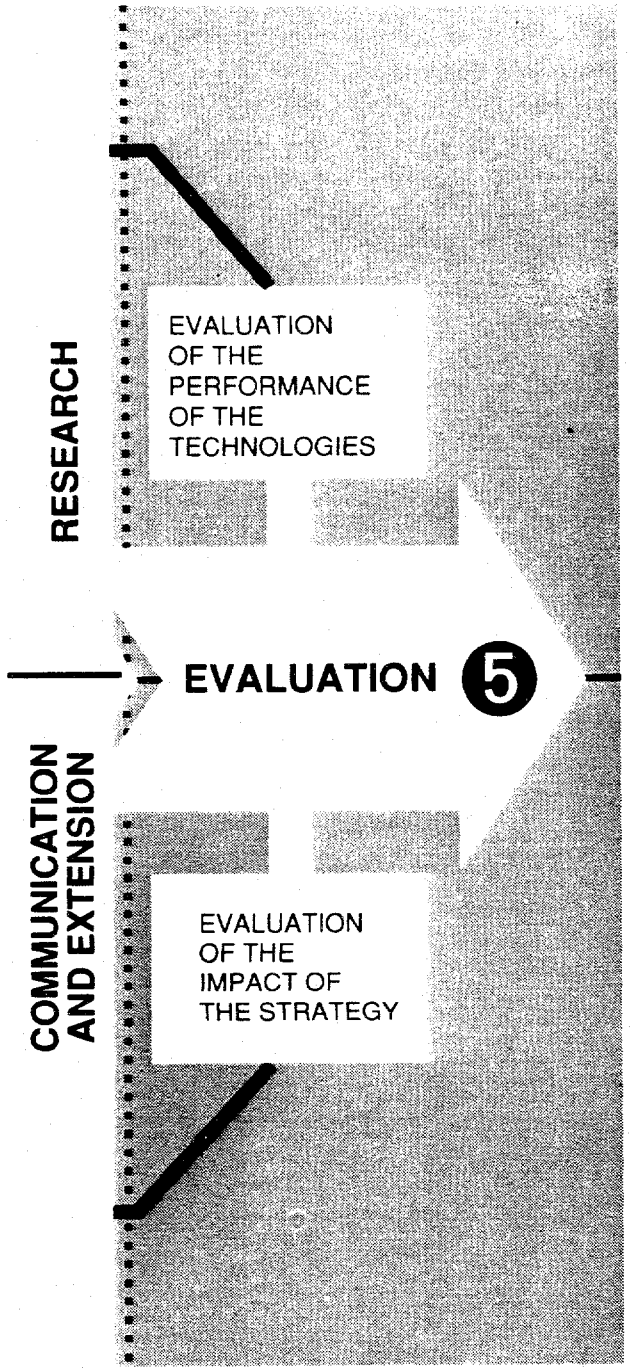
Effective implementation of the communications strategy means that the messages have the greatest possible coverage. This requires:

- training the personnel responsible for the strategy elements so they are optimally effective;
- efficient management and leadership to ensure that plans are carried out within established time frames; and
- continuous monitoring of activities to make necessary adjustments or corrections as the project develops.

CHAPTER VII

Step 5
Evaluation: Measuring the Transfer

THE CTTA METHODOLOGY



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INTRODUCTION

The technology transfer methodology proposed by CTTA provides for continuous evaluation activities. Evaluation is a fundamental and ongoing component of this methodology. The initial assessment is an evaluation of the situation prior to the communications activity. Testing the educational materials used in the strategy, prior to their final production, is also a means of evaluating their potential for achieving the planned objectives. Continuous monitoring during the implementation of the strategy is a way of evaluating the performance of the various components of the strategy.

In addition to the various types of evaluation mentioned above, the methodology proposes a series of periodic formative evaluations that are conducted at specified times during strategy implementation. They are intended to analyze the progress achieved and thus facilitate reprogramming of the strategy or making any adjustments deemed necessary. At the conclusion of the process, a final evaluation will measure the impact achieved as a result of the activities against the objectives set by the transfer program.

THE FORMATIVE EVALUATION

The *formative evaluation* is conducted at predetermined times during strategy implementation to measure the performance of each of the various components and the impact achieved by the implementation. The results of the formative evaluation make it possible to adjust and adapt the various components of the strategy to focus them more effectively on the achievement of their objectives.

WHAT IS EVALUATED IN A FORMATIVE EVALUATION

A formative evaluation assesses the strategy's capacity to develop an efficient process of technology transfer. This capacity is measured by the degree to which the strategy is capable of:

- **informing** farmers about the existence of new technologies or practices to improve production;
- **motivating** the farmers to adopt these new technologies and put them into practice; and

- **training** the farmers to apply the technologies correctly.

Capacity to inform: coverage

The capacity of the strategy to **inform** means its ability to deliver the messages to the largest possible target audience. This ability depends on:

- Appropriate selection of communications media and channels for disseminating information; and
- Appropriate presentation of messages to spark the farmers' interest.

Evaluation of coverage reveals whether the selection of media was appropriate, and whether the dissemination of the messages was both motivating and timely.

Measuring coverage requires knowing:

About the messages

- How many farmers now hear the various messages,
- Which of the messages have been heard the most,
- Which of the messages are remembered best.

About the communications media

- Which media have been most efficient in disseminating the messages,
- Through which media has the target population heard the messages,
- Which formats have been responsible for the best understanding and acceptance of the messages.

Evaluation of coverage therefore makes it possible to:

- Determine which groups of farmers or which segments of the target population are receiving the messages, and which groups require greater attention. This can lead to decisions to refocus communications activities toward particular segments of the target audience.
- Determine which messages are most well known and which require more dissemination. With this information, it is possible to decide which messages

should be withdrawn to provide more space for those that have not yet reached the target population or that the population is not yet able to remember correctly. It is also possible to analyze the changes that might be needed for the messages to be better understood and remembered by the farmers.

- Determine which formats have been most effective in making the various messages understandable, so that those formats can be used in the future for transmitting other strategy messages.
- Determine through which media and at what times the target population has been most exposed to the various messages. With this information, it is possible to decide which media can be reinforced or whether broadcast times are the most appropriate.
- Determine which channels have been most adequate for distributing printed materials to farmers. In this way, it is possible to concentrate distribution on the most efficient channels or reinforce all of the channels in current use.

Capacity to motivate: acceptance and adoption of the technology

Some number of farmers who have had access to the messages transmitted by any of the media will have been **motivated** to accept them and will have put them into practice. The formative evaluation must identify the characteristics of these farmers as well as the characteristics of those who have not adopted the recommendations. In both cases, it is necessary to identify and analyze the reasons and motives for accepting or rejecting the messages.

THE LOWER THE COST, THE HIGHER THE ADOPTION

The first formative evaluation carried out in Marcará, Peru, indicated that the farmers were more receptive to, and put into practice first, those technologies that did not require any cash outlay. Based on that initial evaluation, researchers were asked to identify the most inexpensive ways to implement each of the recommendations that they planned to propose in subsequent stages.

Knowing the degree of acceptance and adoption that the messages have enjoyed makes it possible to:

- Adapt the messages to the characteristics of those farmers who have not accepted them, to be more responsive to them in the future.
- Determine which motivating factors have been most effective, to use them in the future.
- Identify the most motivated farmers who accepted the recommendations and use their testimonies in the future to motivate others.

An essential aspect of the application of the technologies is the availability of any inputs required for their use. The formative evaluation should analyze such availability and the adaptations that the farmers made in applying the technologies according to their own conditions and resources.

Capacity to train: correct application of the technology

There is also a need to determine how many of the farmers who have adopted the new practices have done so correctly. Here the capability of the strategy to **train** farmers in the correct application of the transferred technology is measured.

It is important to know the characteristics of those farmers who have applied the advice properly, and of the medium through which they learned to implement such behaviors correctly. Knowing which circumstances have favored the proper learning of the promoted behavior will enable future replication among those segments of farmers that have not learned the behavior.

This means:

- Adapting the messages so that they will better transmit the behavioral sequences that the farmers are expected to put into practice,
- Better integrating the communications media to carry out the strategy's training function efficiently,
- Incorporating into the recommendations the advice or experience of successful users of the technologies.

WHEN TO CONDUCT A FORMATIVE EVALUATION

The decision about when to conduct a formative evaluation is made at the time the strategy is designed, since the

evaluation forms a part of that strategy. How many formative evaluations to conduct and when to conduct them will depend on the nature and duration of the strategy.

A strategy might have as its objective the promotion of a particular technology or specific behavior, at a set time in the production cycle of a particular crop. At the conclusion of the period when the technology or behavior should have been applied, a formative evaluation is conducted to analyze the effect of the strategy and to make any adjustments necessary to ensure that it is executed more efficiently during the next agricultural cycle.

Another strategy, *for example,* might cover numerous behaviors occurring throughout the entire agricultural cycle of one or several parallel crops. Accordingly, implementation of the strategy would cover planting to harvest, in the case of a single crop, or from the planting of the first crop through the harvest of the last crop, in the case of several. In these cases, a formative evaluation should be scheduled for more or less the mid point in the implementation of the strategy. At the conclusion of the first full cycle for which the strategy was used, it is again necessary to conduct an evaluation and, based on the results, adjust the strategy for the following agricultural cycle.

THE OBJECT OF EVALUATION IS IMPROVEMENT

In the CTTA pilot zone in Peru, the strategy covered a number of different behaviors during the production cycles of several crops. Three months after the communications activities began, an initial Formative Evaluation was conducted.

As a result of that evaluation, a decision was made to use the Quechua language in the radio broadcasts, and some of the print formats were also modified. Based on the results of that evaluation, the strategy was transformed into a distance education process combining the radio programs with illustrated Learning Guides; the channels used for distributing print materials were improved; and community training events that had not been contemplated initially were added.

EVALUATION TIMETABLE

The first formative evaluation in the pilot area in Peru was conducted approximately five months into implementation of the communications strategy, as follows:

MONTHS	NOVEMBER				DECEMBER				JANUARY			
Weeks	1	2	3	4	1	2	3	4	1	2	3	4
Information Review			•									
♦ Define objectives			•									
♦ Determine techniques			∘									
Instrument Design				•								
♦ Test instruments					•							
♦ Adapt instruments					•							
Personnel												
♦ Select					•							
♦ Train					•							
Field Work						•						
Data Tabulation and Processing							•	•	•			
Data Analysis										•		

Overall, the work took about two months. However, implementation time depends on the techniques selected, personnel involved and available resources. Ten surveyors performed the field work. Over a four-day period, a total of 190 farmers in five *campesino* communities were interviewed.

HOW TO CONDUCT THE FORMATIVE EVALUATION

The mechanics of conducting the formative evaluation are the same as for the assessment. Planning the evaluation, gathering information in the field and tabulating and analyzing data follow the same steps as described for the assessment. (*See the sample timetable and Chapter IX: Social Research Techniques for Assessment and Evaluation.*)

Some considerations

When conducting the evaluation, it must be taken into account that, in many cases, the farmers are exposed to other sources of information on agriculture. Even those farmers with the lowest incomes are reached by advertising for chemical products, such as fertilizers and pesticides. It is important to ensure that the evaluation covers just the messages and activities related to the strategy. Therefore, questions about the messages and materials used in the

THE EVALUATION UNCOVERS CONFUSION

In the CTTA pilot zone in Peru, the regional agriculture office in charge of project implementation was known by the acronym CIPA (Centro de Investigación y Promoción Agropecuaria or Center for Agricultural Research and Promotion). When activities were initiated, authorities at the Center insisted that radio and graphic materials always be credited to CIPA. In this way, the institutional presence was reinforced by the communications activities.

However, in the city was a firm engaged in marketing agricultural products, also known as CIPA (Compañía Importadora de Productos Agropecuarios). It also advertised pesticides and agricultural products over the radio. During the first formative evaluation, this created a some confusion. When the farmers were asked if they had heard a message on fertilization or pest control, some answered affirmatively, referring to products promoted by the commercial firm in its radio advertising. The directors of the Centro de Investigación y Promoción Agropecuaria needed to be convinced that because of their interest in promoting their own institution, the agricultural marketing firm was reaping the benefits.

strategy should be as specific as possible. If necessary, the farmers being interviewed for the evaluation should hear the messages or view the materials to ensure that both farmers and interviewer are talking about the same thing. A similar procedure might be necessary for the radio material: the interviewees could be asked to listen to each of the radio spots and then answer specific questions about them.

The formative evaluation should gather *quantitative* as well as *qualitative* information. Information is sought not only on the percentages of coverage, adoption, and application of the practices being promoted, but also the reasons for adopting, rejecting or failing to apply new practices correctly.

Quantitative techniques

In the section on how to conduct the assessment, techniques were mentioned that are described in detail in Chapter IX. The point of reference for comparing the results of the evaluation is, precisely, the assessment and the objectives which, based on the results of that assessment, were formulated for the strategy.

The questions in the quantitative research instrument fall along the following lines:

- First, it is important to identify those characteristics of the farmers that could influence the adoption and application of the technologies. These characteristics include, but are not limited to, the following:

  - Type of crop
  - Type and extent of land
  - Degree of literacy or level of schooling
  - Access to technology distribution centers
  - Access and exposure to the various communications media

- Next, each of the technologies promoted up to the time of the evaluation is analyzed. The following points should be evaluated for each of the technologies:

  - Whether the farmer has heard of the technology,
  - At what point the farmer learned of it,
  - Through what communications media: radio, printed materials, a neighbor, an extension agent,
  - If through written materials, how those materials reached the farmer,
  - Whether the farmer remembers if the message indicated how the technology or behavior was to be applied,
  - Whether the farmer applied it on the crop, and, if not, why not,
  - If the farmer did apply it, how easy or how hard it was to apply,
  - If the farmer encountered difficulties, what resolved the problem,
  - What results were observed.

The above analysis should be accompanied by the farmer's comments and views about all of the information sources for the technologies promoted.

If the farmer received graphic material, ask:

- Whether it was easy or difficult to read and understand,
- Which aspects were the easiest to understand and which the most difficult, and why,
- What form of graphic presentation would be understood more easily, or easier to save and refer to in the future.

If the farmer received the information over the radio, ask:

- On what radio station (if several are used) and at what time (if the messages or radio programs are broadcast at different times) the messages were heard;
- The farmer's opinion of the type of program heard; ask specific questions on the format. *For example*: What do you think of this or that character?

Qualitative techniques: case evaluation

In addition to the social research techniques already mentioned, **case evaluation** is a very valuable technique. This is a qualitative research technique and is useful in evaluating behavioral changes over a particular span of time. It involves selecting a series of farmers and their families, which should be representative of the target population, and tracking the methods they use to carry out their agricultural activities to determine the extent to which those methods are being modified and whether the behaviors promoted are actually adopted. (*See the sample questionnaire in Chapter IX.*)

One of the primary **advantages** of this particular evaluation technique is that adoption of the behaviors can be analyzed within the context of the overall production system of the farmer and the family. Its primary **disadvantage** is that, if the relationship with the farmers studied becomes formalized in some way, they may become "authorities" on the subject matter. *For example,* when they see that they are evaluated and that they will continue to be evaluated periodically, they may consider themselves to be a part of the activity and accordingly take greater interest in the messages. This reduces the credibility of any projection of the results.

As a general rule, the farmers to be studied are selected at the beginning of the process and are included in

the assessment, although the study of these farmers is conducted separately. The results, even though they are used to enhance the assessment, should be kept separately and treated as a distinct research effort.

These selected farmers are then regularly visited to determine:

- Whether they are listening to the recommendations,
- What their attitudes are with respect to the recommendations,
- Whether they are adopting the recommendations and putting them into practice,
- Any difficulties they encountered in adopting the techniques and applying them correctly.

At harvest time, an analysis is made of their production level and of the quality of their harvest. All of the above is then compared to the results obtained in harvests prior to the communications activity.

THE FINAL EVALUATION FOR MEASURING THE IMPACT OF THE TRANSFER

A plan, project or transfer strategy has a scheduled duration for achieving its objectives. This duration may have been modified following adjustment of the strategy as a result of successive formative evaluations, but there will come a time when it is necessary to determine the results of that strategy.

At the beginning of the process, the initial assessment established a situation:

- The particular production rates to increase,
- The crop management practices to improve,
- The technological constraints to overcome.

The strategy formulated certain objectives for modifying the conditions thus detected. At the conclusion of the process, it is necessary to evaluate the extent to which those objectives have been achieved and determine what lessons have been learned as a result of the evolution of the transfer strategy. In this way, these lessons can be applied to future programs or projects.

The **final evaluation** can help provide an understanding of why a program or activity has achieved or failed to

VARIABLES THAT ARE NOT CONTROLLABLE BUT THAT ARE NEVERTHELESS PREDICTABLE

In the community of Vicos, in the CTTA pilot zone in Peru, two technologies for growing wheat were promoted during one of the production cycles. One involved delaying planting to take advantage of the rainy season so that the land would be better prepared and thus promote a higher percentage of seed germination. A second technology involved certain changes in the dose of fertilizers to be applied, which would result in fuller spikes.

The community applied the recommendations on the community crops, and at the end of the cycle the results were spectacular. The community parcels were crammed with wheat plants having large spikes filled with kernels of wheat. But several days passed and the wheat was not harvested. New rains proceeded to rot it. What had happened?

The answer lay in a cultural factor. By delaying planting, the ideal time for the harvest coincided with the so-called "Fiesta de las Cruces." This celebration traditionally marks the *end* of the harvest and lasts for several weeks of drinking and dancing when, naturally, no one does any works. Unfortunately, simultaneously with the Fiesta de las Cruces there arose in the community a problem involving the leadership and everything came to a halt while new authorities were elected. The community was unable to get any of its sectors to take charge of the harvest, almost all, of which was lost.

No one realized at that time what the delay in planting might mean, beyond the material benefits of better preparation of the land and greater seed germination. From that point on, any potential change in the agricultural calendars was reviewed in detail to ensure that it would not interfere with any cultural festivity, periods in which changes of authorities were scheduled or occurrences of a similar nature.

achieve the success expected, as well as the extent of that success. It can show the type of farmers who most benefited from the program or activity and what specific circumstances were responsible for such a result. The information obtained from the final evaluation is valuable not only for determining what has actually happened,but for planning future efforts as well.

WHAT IS EVALUATED IN THE FINAL EVALUATION

Just as the objective of the formative evaluations was to evaluate the performance of the various components of the strategy, the objective of the final evaluation is to measure achievement of the objectives established for the project as a whole. The final evaluation measures the extent to which expected behavioral changes have been achieved or the recommended technologies have been adopted, as well as the effect such changes and adoptions have had on the outcome of production.

- The organization and management of the activities carried out, as key variables in the final results.
- The level of institutionalization that the methodology has managed to achieve in the organization responsible for this application.

1. Results of the transfer program

It is necessary to evaluate the levels of coverage, adoption and correct application of the technology promoted that have been achieved at the conclusion of the activity. In addition, however, it is necessary to evaluate at this point the effect that these results have had on agricultural production and on the standard of living of the farmers.

Some variables cannot be controlled by the communications strategy, and they play a decisive role in the final results:

- The quality of the technologies being transferred, (If these technologies are not appropriate or if their application does not provide the results expected, the communications program will be unable to resolve such constraints.)
- Climate,
- Variations in the market and in the agricultural policy in effect in the country,
- Institutional problems and human and cultural factors.

2. Lessons learned

Evaluation is not simply a matter of calculating hard numbers indicative of the changes in the knowledge, attitudes or

behavior of the farmers as a result of the program. Evaluation also allows learning about the factors involved in the success or failure of the outcome. In this way, future interventions can build on this experience and replicate the most efficient aspects of the process.

The lessons learned are something that should be evaluated by the team of researchers, extension workers and communicators that intervened in application of the methodology. An attempt is made to determine in what way the activity has modified the focus of the various participating programs and how such modifications can be made more stable for the future. One way to make the changes in the focus of the programs more stable might be to effect certain changes in the organization or structure of the organizations, *for example,* facilitating the necessary coordination among the research, extension and communications programs.

3. Organization and management of activities

It is essential to evaluate the operation of the project to determine how it has been managed and in what way the management system has influenced project success or failure. The following should be evaluated:

- organization of the work team;
- coordination mechanisms for implementing the activities; and
- administration of the program and all areas having to do with the management of activities.

This is an essential component of the transfer process and must be taken very much into consideration if the process is to be replicated.

4. Degree of institutionalization

It is also important to analyze in what way the programs that have participated in the process, as well as the organization as a whole, have been influenced by application of the methodology. This involves measuring the benefits that the organization has obtained in terms of:

- personnel;
- organizational structures;
- coordination mechanisms; and

- institutional presence in the field, as well as other factors related to the development of the institutional capacity for the long-term management of the methodology.

HOW TO CONDUCT THE FINAL EVALUATION

The same techniques used for the assessment and for the formative evaluation are used to evaluate the impact of the process on the farmers. However, the final evaluation may require larger samples and larger amounts of quantitative data for measure and comparison. Accordingly, the **survey** is the most advisable technique for obtaining information from the farmers. (*See the sample in Chapter IX.*)

To analyze the results of the final evaluation, points of reference are needed for purposes of comparison.

- The first point of reference is the situation existing prior to initiation of the activity. This situation should have been studied by the assessment of the area where the technology transfer was to take place.
- Another point of reference is the evaluation of communities not covered by the communications and transfer activities. The conditions existing in these communities also provide points of comparison and determine in what way the communications activities have influenced differences in crop management and increases in production.
- A third point of reference is the cost-benefit ratio of the activities making up the process. This involves determining whether the results obtained are appropriate with respect to the costs involved in the program.

Some projects conduct, at the onset of their activities, a baseline research exercise to gather quantitative data on production, use of technologies and other elements, both in the area in which the activity is to be carried out and in "control" communities located beyond that zone. At the conclusion of the activity, this research exercise is repeated and the results obtained in both cases are compared, to determine which differences are the direct result of the intervention. Other projects that do not have sufficient budgetary funds available to cover such activities take the results of the initial assessment as a point of reference and

compare the results of the final evaluation against those results.

CHAPTER SUMMARY

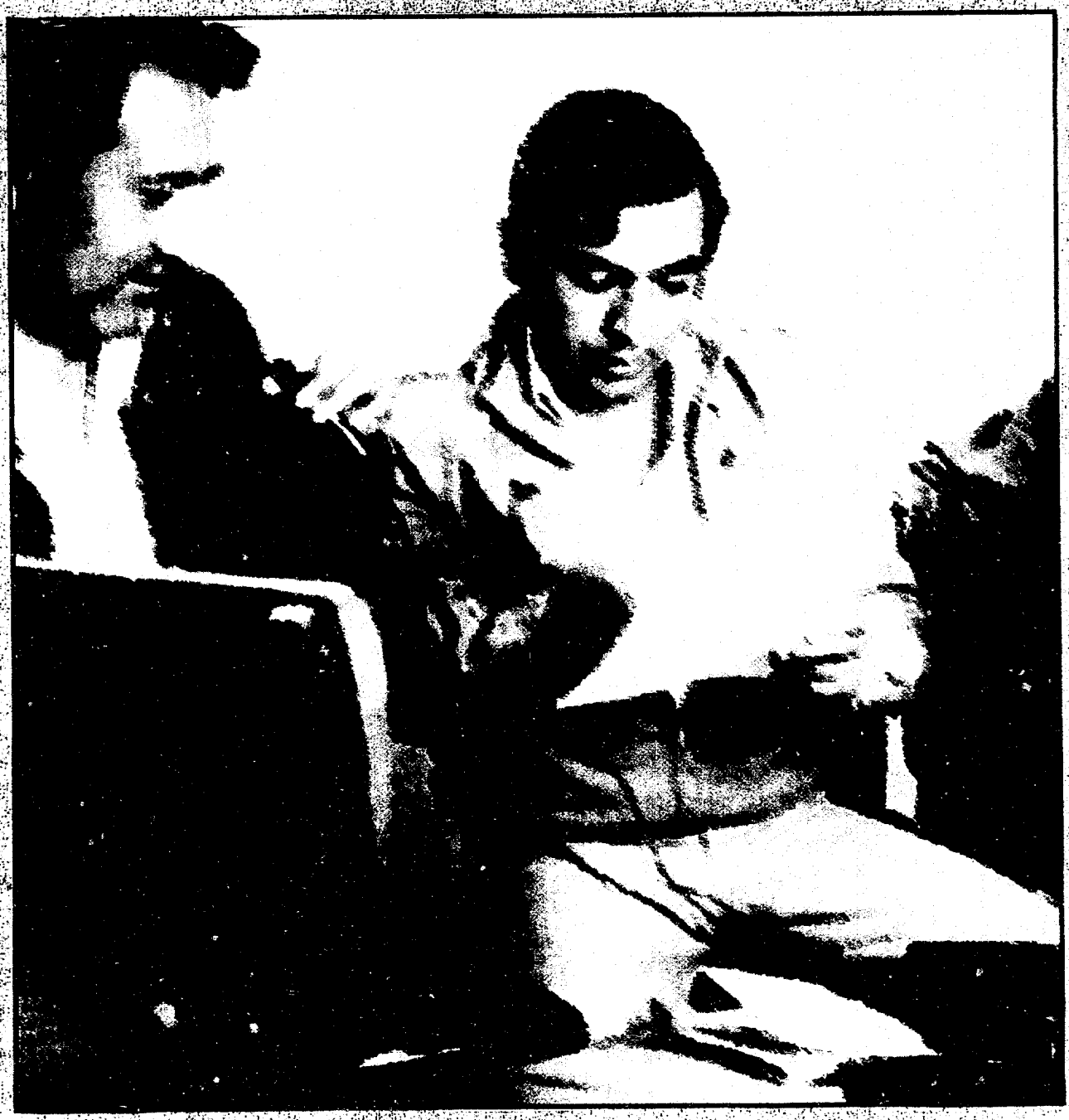
Evaluation is a continuous process in the CTTA methodology.

- The initial assessment is a form of evaluation of the situation that is to be changed and improved.
- Ttesting the communications materials prior to their final production is a form of evaluating their ability to transmit the messages efficiently.
- Continuous monitoring of the activities ensures that necessary corrections can be made as the project develops, which, in turn, ensures that the objectives will be attained.
- The periodic (formative) evaluations conducted at particular times during implementation of the strategy make it possible to adjust the various strategy or media components as necessary.
- The evaluation conducted at the conclusion of the transfer strategy implementation makes it possible to determine the impact achieved by farmer adoption of new agricultural practices or technologies on the increase in production and the farmers' standard of living.

Quantitative and qualitative techniques employed in the assessment at the beginning of the process are used to conduct these evaluations.

CHAPTER VIII

Institutionalization: Sustaining the Impact



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INTRODUCTION

Institutionalization, or the systemic adoption, of a methodology in an organization is a process similar to transferring a new or improved technology. The same principles apply in both cases.

A methodology has been institutionalized when the mechanisms and procedures for its application have been established by the organization and incorporated into its operating system. For this to happen, the organization must be aware of the advantages offered by the new methodology, be motivated to apply that methodology and train personnel to handle it efficiently to obtain the expected results.

Adoption of a new technology by farmers is the result of numerous factors. Adoption of a new working methodology by an **organization** is also the result of many different factors. Intervening in that adoption decision are conditions that are not only technical but among other things, political and personal as well. Even the personality of and receptivity to the individual proposing the technology represent a variable that may tilt the balance for or against adoption.

What is important to remember is that institutionalization is not an improvised task. It cannot be left entirely to chance. It should take place as a response to a systematic process and follow rules of operation that should be established from the outset. It is a process that can be adjusted and changed as conditions change.

WHAT IS INSTITUTIONALIZED

For purposes of their transfer, agricultural technologies are defined as a series of behaviors to be applied to a crop to develop greater productivity. A methodology is also composed of a series of principles, actions, mechanisms and operating procedures. To institutionalize a methodology means that the organization must correctly implement the actions leading to its application. Toward this end, it must adopt the mechanisms and procedures required by the implementation of those actions.

Not only concepts are institutionalized. The rules of operation of a methodology must be put into practice or institutionalization will not occur. To institutionalize the communications methodology proposed by CTTA, the organization should adopt as its own (if it has not already done so) the following general methodological principles:

- To be effective, the development and transfer of agricultural technologies should be based on the needs and characteristics of the farmers.
- The technologies to be transferred should be confirmed with the farmers under their own conditions and adapted to those conditions prior to transfer.
- The objectives of a transfer strategy should focus on achieving attitudinal and behavioral changes in the farmers and not on the implementation of a certain number of activities or on the number of visits made by extension workers to a particular number of plots of land.
- The transfer strategy should systematize the use of many different communications media and channels in an integrated fashion and based on the characteristics of those media and the characteristics of the farmers themselves. It should be noted that no one channel by itself can achieve the objectives of informing, motivating and training a large number of farmers in the adoption of new or improved agricultural technologies.
- The technology development and transfer process should be accompanied by continuous follow-up and evaluation, for the necessary adjustments to be made with a greater degree of effectiveness. All of the steps involved in the technology development and transfer process are interactive and should be interlinked by means of a continuous process of feedback.

In addition to the methodology, the mechanisms and actions that contribute to the application of that methodology should be institutionalized. These actions are:

- The carrying out of research activities involving farmers,
- Identification of the technologies to be transferred, as an outcome of the assessment,
- Testing and adaptation of the technol-ogies before their final transfer to the farmers,
- Systematization of the planning process for transfer strategies, and the participation of extension and communications personnel in designing and implementing those strategies,
- Implementation of impact monitoring and evaluation activities that provide feedback to the researchers and

personnel responsible for implementing the communications strategies for technological transfer.

To implement the transfer methodology correctly, staff must receive ongoing training. Such training requires planning and an implementation system that must also be institutionalized to provide continuity in the effective use of the methodology.

CONDITIONS FOR INSTITUTIONALIZING THE METHODOLOGY

For a new technology to be adopted by farmers, it must meet a series of conditions. The conditions an organization must meet to adopt a new or improved working methodology are almost the same. This new methodology must:

- respond to the needs and interests of the organization;
- demonstrate effectiveness and efficiency;
- adapt to the availability of institutional resources; and
- integrate into the operating system of the organization.

In addition to the above conditions, the proposed methodology must enjoy political support.

1. Respond to the needs and interests of the organization

The first requirement noted earlier for effective technology transfer is to begin with the views of the farmers, their problems, their needs and their characteristics. Similarly, to transfer the methodology to an organization, it is essential to first identify its problems, its interests and its needs in the area of communications and technology transfer, as well as its characteristics, so that the strategies for applying the methodology can be adapted to them.

To identify an organization's problems and needs in the area of communications and technology transfer, an analysis should be conducted of how the organization is currently dealing with these areas. This analysis should review the entire process of technology development and transfer by identifying any barriers and constraints to attaining institutional objectives.

The questions to ask for this assessment include the following:

- How does the organization decide what to research? What role do farmers play in this decision?
- What consultation mechanisms are used with the farmers?
- How are technologies delivered to the extension agents?
- How are communications and technology transfer planned?
- What are their goals and objectives?
- How does the organization decide what to communicate? How are messages determined and by whom?
- How does the organization decide which media to use? Are these media appropriate and are they managed efficiently to meet the objectives?
- How do the messages reach the target audience in a timely fashion?
- What mechanisms are used to evaluate the impact communications have on farmers' adoption of new technologies?
- What institutional capabilities exist for managing communications in terms of personnel, inputs and financial resources?

By analyzing these issues with the staff of the organization, it will be possible to identify any communications problems existing in the institution, whether perceived or not, and determine how the proposed methodology can contribute to solving them.

Communications for cooperation

The most commonly identified problems are the communications obstacles between and among researchers, extension workers and farmers. These three groups frequently do not interact appropriately.

Extension workers want more, better and more timely technologies from the researchers. A common complaint is that the technologies are neither useful nor transferable. This is attributed to the increasing isolation of agricultural research from the realities of rural areas.

Researchers, on the other hand, complain that they do not get the necessary feedback from extension agents to focus their research programs properly.

The communications problems between extension agents and farmers are manifest in low levels of coverage attained by the transfer programs and in low levels of adoption of improved agricultural technologies by the farmers.

In the case of communications, whether a problem or need is perceived as such by an organization depends on how it values this discipline as an instrument for fulfilling its objectives and interests. This will be the result of prior experiences and of the role of communications in those experiences. Knowing and analyzing these prior experiences helps to focus the proposed new methodology.

The most common problems relating to communications use tend to be inadequate management of media, and the lack of planning and methods in the use of this important resource. These problems need to identified and acknowledged so that the proposed methodology can be adapted to them.

Another very important area to be analyzed is the organization's resources: physical resources, human resources and inputs for handling the communications methodology. All of these elements must be taken in account when designing a strategy that can be managed by the organization and evolve progressively with it.

2. Demonstrate effectiveness

Just as a farmer will adopt a new technology only if it is proven to be effective, an organization will only accept a methodology if it can prove that the methodology is more effective than that it has been using until then. Therefore, the methodology being proposed must not only *be* effective, it must *demonstrate* its effectiveness. This means that it must publicize, at every opportunity, all activities carried out in the course of applying the methodology, and keep those who should be aware of its achievements informed. The worst enemy of institutionalization is lack of information or misinformation.

Mechanisms need to be created to tell the various institutional levels about the effectiveness of the methodology. Do not wait until key individuals learn about organization activities on their own. An organization needs a system for conveying information to those individuals whose opinions may influence the application of the methodology. To do this, it should take the following steps:

SHARING THE INTEREST OF THE ORGANIZATION MAKES INSTITUTIONALIZATION EASIER

In Peru, INIAA, the organization charged with technology development and transfer, was concerned about the extension service's low level of coverage and sought ways to broaden that coverage. It felt that a mass communications system could be a valuable tool for supporting the extension services, but thought that its current methodology would need to be reviewed and modified to make it more effective.

INIAA had been implementing communications activities since its inception. It had available, at the central and regional levels, personnel and inputs for carrying out activities in this field. It was only when the current situation and the activities involving technology transfer and communications were analyzed that problems surfaced.

The CTTA methodology offered farmers simple mechanisms for consultation that allowed them to identify their needs and production problems and feed this information back to the research programs. It also served to systematize communications activities by directing them toward concrete transfer objectives. In this way, technologies that answered the needs of the farmers were delivered to the farmers at the appropriate time, in an understandable instructional format, through channels that were most accessible to the farmers.

A similar experience occurred in Honduras, where the Ministry of Natural Resources was carrying out extension and communications activities. There was no methodology in place to systematize and standardize technology transfer activities. The CTTA methodology offered a common frame of reference and extension workers were trained in its use. The Ministry's communicators were deployed to provide support to the extension program, and the extension workers were trained to use a number of different communications media in their work.

The CTTA Project was embraced enthusiastically by the new regional director for Comayagua, where the pilot stage of the project was established in Honduras. The project would allow him to implement a portion of the reorganization that he wished to carry out in the extension services. The CTTA approach, based on identifying the needs of the farmers, coincided with this director's idea of an appropriate focus for the extension program.

The CTTA Project proposed to use a combination of communications media to increase service coverage despite existing constraints. This would help develop a new and more credible image for the organization. When he saw that the project would support the activities he had already initiated, the regional director gave his unconditional support.

1. A schedule of **systematic meetings** should be planned at various levels of the organization with key individuals. These meetings will report on how the activities being implemented are supporting achievement of established objectives. These meetings can be held monthly. Those held at the central level should be called and chaired by the director, or the director's representative, of the organization. They should be attended by the directors general and heads of the various programs and institutional areas.
2. **Presentations** should be prepared periodically to show the results being obtained with each technology transferred, or to share information on progress in implementing the activities. These presentations should make full use of audiovisual media.
3. Implementation of the various stages of the methodology should be supported by **technical reports**. These reports should be distributed widely among decision-making personnel (directors and principal advisors). Initially, these reports may go to a wider audience than necessary; those needing this information eventually will self-select.

Many of the individuals who receive these reports will be too busy to read them. Thus, a three- to four-page **executive summary** should be prepared and discussed personally with key individuals. This will help many of them to form an opinion on the methodology without having to read all of the documentation.

In addition to presentations for the organization, it is advisable to share the work with other organizations and through other media. To the extent possible, the methodology should be made known through **articles** in the organization's magazines, if applicable, or in national, regional or local newspapers, as the situation permits.

3. Adapt to the availability of institutional resources

Just as technology must be adapted to the characteristics and means available to the farmers for them to adapt the technology, so also must the necessary mechanisms and procedures for putting the methodology into practice be adapted to available institutional resources and the ability of the organization to put them into practice.

INFORM CONTINUOUSLY

In Peru, CTTA encountered some resistance at first from individuals who felt that the methodology would simply be another of the many agricultural extension field experiments. During the first year, the project held, on the average, one presentation per month for staff members at the INIAA and their respective advisors. During these presentations, explanations were provided on the advantages of the methodology by comparing it to other known methods. Each time, these advantages were illustrated with new and practical examples taken from field activities.

In addition, project personnel prepared technical reports for each methodological step as it was developed, such as the assessment, the work plan for the pilot zone, the strategy for each of the stages, and the results of the formative evaluations. These technical reports were disseminated widely and publication of each was followed by a presentation made to the management staff of the organization.

Upon receiving the results from the first formative evaluation, the project invited several directors to observe the field work firsthand. A central-level commission visited the area, talked with several farmers and then witnessed a presentation of the results by project counterpart personnel.

This presentation formed the basis for the organization's decision to extend application of the methodology to two new sites. Thus was born a process of growth, which, in the third year, led the methodology to be applied in twelve experimental stations located throughout the country. During the course of the program's implementation, project staff in Peru prepared two articles for the official INIAA magazine, which, in this way, was lending its institutional support to the methodology by showcasing it as one of the organizations most important activities.

CTTA in Honduras created an awareness of the importance and effectiveness of the work being carried out among representatives of public sector organizations responsible for allocating funds. To do this, CTTA organized guided trips to the work sites during which it demonstrated the results that could be obtained with increased financing for the activities being carried out. Similar visits were scheduled for officials from USAID and the Ministries of Planning and the Treasury. In addition, CTTA staff members presented their methodology, together with the results obtained, in numerous forums at the regional and national levels.

Resources available to the organization should be used.

If a new technology requiring the use of inputs is proposed to farmers, and if they are given all of the resources necessary to apply that technology, such as seeds, fertilizers and pesticides, they will doubtless agree to **test** the technology. If it elicits good results, they will be convinced of its usefulness. But getting the farmers to **adopt** a technology involves not only convincing them of its usefulness but also getting them to apply it and incorporate it into their own system of work. It is necessary to consider whether they will be able to apply it in the future with their own resources or, lacking such resources, whether they will revert to old practices, perhaps even more frustrated than before.

A similar phenomenon occurs when a new methodology is introduced to an organization. If the proposal for the methodology is accompanied by financing to put it into practice, it will not be difficult to convince the organization to agree to test it. But, if application of the methodology requires resources to which the organization has no direct access, institutionalization will depend on the possibility that a source of financing can be identified to provide the necessary resources. This is not always possible for long periods of time. This is one reason why some organizations may say that they "have already tried everything," but have been unsuccessful in incorporating a method.

It is much more realistic for communications strategies for technology transfer to be framed within the organization's available resources. However, these strategies can be projected toward future growth under the assumption that funds will be available for that purpose.

Therefore, an initial activity consists of evaluating available resources for carrying out the proper application of the methodology. This evaluation will determine:

- What can be done with the organization's available resources,
- What would need to be improved and whether the organization would be willing to make any changes and improvements deemed necessary,
- How it will be possible to reinforce the organization's ability to design more ambitious strategies, within the framework of the methodology.

New resources should be found to strengthen the capabilities of the organization during the pilot stage, while the methodology being proposed is being tested and adjusted.

Once the methodology has proven itself to be effective, the organization will allocate the necessary resources for implementing the necessary activities in its annual budget. If there are prospects that external financing will become available in the future, then it is possible to expand the strategy that has been designed.

Institutional personnel should be able to manage the methodology efficiently.

For institutional personnel to manage the methodology efficiently, they need to accept it as their own and not as an activity operating parallel to one in which they normally engage. In addition, they need to be sufficiently trained and have sufficient confidence in their ability to undertake the activities efficiently.

Training for the personnel responsible for communications and technology transfer is essential for achieving effective institutionalization. This training should be continuous and provided "on the job." Personnel training occurs in two ways:

- formal training in specific aspects of the methodology, and
- training that results from participating in decision making and in the application of the methodology.

Training of trainers: the workshop

Formal training should be planned carefully so that personnel will acquire the skills necessary for managing specific aspects of application of the methodology. Theoretical-practical workshops should be scheduled on basic aspects of the methodology, such as the following:

- Techniques for planning and implementing the assessment,
- Techniques for testing and adapting the technologies to be transferred,
- Design of communications strategies for technology transfer,
- Techniques for the production of educational communications materials,
- Techniques for monitoring and evaluation.

SMALL IMPROVEMENTS CAN LEAD TO BIG RESULTS

In the pilot zone in Marcará, Peru, CTTA began to work with the resources and means that the organization was already applying to its communications activities. In an early stage, an analysis was made of how those resources and means could best be combined and used to obtain better results.

As a result of the analysis, radio use was systematized so that the content of radio messages would deal with priority issues for a crop grown in the area, and be timed to its cultivation cycle. In this way, radio communications already being carried out by the organization became more timely. An analysis was made of both the radio and print formats being used. The Quechua language was incorporated into the radio broadcasts and the formats of the graphic materials were modified to make them more understandable and practical for farmers who were virtually illiterate.

These small initial changes made it necessary to strengthen the communications office by adding two people to its staff. Although these individuals were paid for a time with external funds, the organization then incorporated them into its permanent staff once it decided to continue using the methodology.

When the distance education strategy was designed, the project had available to it the capabilities of the regional office for producing radio programs and graphic materials, which, together with the efforts of extension workers, were designated to be the primary media for the strategy. Based on the ability of the organization to carry out fieldwork, community training activities were included as an additional basic channel for implementing the strategy.

Based on the organization's ability to obtain resources, production of audiovisual materials was projected for each technology, taking into account the content of the graphic materials and discussion of them in the radio programs. These audiovisual materials would reinforce the group training activities. The possibility of printing larger quantities of graphic materials and of reproducing the radio programs on cassettes was also proposed. This would allow carrying out training activities in the schools located in the region and designating students as effective channels for technology transfer among their families.

A basic strategy was then designed using available resources, and its future growth was projected on the prospect of obtaining new funds in the future. On the basis of this projection, the organization would be able to seek funding for specific activities.

The distance education strategy in the pilot zone could be implemented easily using institutional resources, which already included the production of graphic materials and transmission of radio programs. In the regions to which the methodology was then extended, the strategies were designed in accordance with the resources available to each region and were managed exclusively by local personnel. Since the organization was already convinced of the effectiveness of the methodology, it financed the activities in the new regions by allocating funds specifically for that purpose.

Such workshops can be programmed to coincide with application of the steps in the methodology. In this way, the theory learned in a particular workshop can be put into practice immediately in the implementation of the methodology.

It is very useful to prepare as many technical documents as possible on how to implement specific steps. Extension workers and field personnel need manuals and instructions that will give them ideas about how they can better perform their work.

In this way, the activities involving the methodology will be incorporated gradually into working methods and, if the methodology is useful, it can be adopted easily at the field level. This process of adoption can be consolidated through the manuals, norms and regulations in effect at the organization.

Learning by doing

On-the-job training occurs with the participation of research, extension and communications personnel in the planning and implementation of the methodology and in decision making involving that methodology. Such participation makes it possible for all parties to obtain an idea of the overall approach, although each will have a specific and specialized function in the implementation of activities. The continuous participation of staff in the implementation of the various steps of the methodology constitutes the basis for generating confidence in the methodology and in the staff's ability to manage it.

There are considerable advantages to planning, implementation and analysis conducted with all those various individuals involved:

- It helps make the activity and its practical utility better understood and accepted,
- It aids in collecting the ideas and suggestions of the participants on how to improve implementation of the activity,
- It helps adapt implementation of the activity to the characteristics and capabilities of the organization in the field,
- It gives the personnel ownership of the activity rather than it being something extraneous to the organization.

4. Integrate into the operating system of the organization

For transfer to be complete, the farmers must incorporate into their production system all those activities, mechanisms and costs required for application of the technology that they have adopted. Likewise, for institutionalization to really take hold, the organization must incorporate into its operating and administrative system all those activities, mechanisms and proposals required for implementation of the methodology.

Designating the office to be in charge of overseeing application of the methodology

The methodology deals with the use of communications to transfer to farmers new or improved technologies effectively. This involves an integrated process ranging from the development of appropriate technologies to their actual adoption by a majority of farmers.

STEP BY STEP

At the start of the program, the following procedure is suggested for implementing each step in the methodological process at the field level:

1. Identify those individuals involved directly or indirectly in the activity's implementation. *For example*, in the assessment phase, those involved are the researchers, extension agents and communicators from the area where work is being carried out.
2. Assemble the pertinent individuals and explain to them the specific steps within the overall framework of the methodology. Explain why it is to be done, how it is to be done and what will be required of each of the participants.
3. According to the availability of each participant, the calendar for implementing the activity is drawn up.
4. For those individuals assigned extremely specialized functions within the activity, a workshop or training day is scheduled to provide them with the skills necessary to implement the activity-*for example*, in designing graphic materials or conducting a survey.
5. Once the corresponding phase of the methodology has been implemented, all of the individuals involved are assembled once more to discuss the results obtained.

EVERYONE SHOULD BE INVOLVED IN THE METHODOLOGY

In the assessment phase in the pilot zone of Marcará, an initial meeting was held in the office of the regional director of INIAA. Present at the meeting were the researchers from the experimental station, the regional head of the extension program, the extension agent for the pilot zone and the director of the office of technical communications, who was responsible for the project in the pilot zone.

In that meeting, the participants were told why the project's methodology required an assessment to be conducted before designing the transfer strategy. The type of assessment proposed was analyzed and suggestions were offered about the availability of certain information in prior studies.

The participants were told how the assessment would be carried out, and the researchers and extension workers were asked to collaborate. Based on their work calendar, an initial schedule of the meetings to be held with them was drawn up. Project personnel also explored the possibilities of participating in their fieldwork, in the event that it was possible to accompany them and collect data for the assessment.

The participants agreed that a workshop would be held on social research techniques, to prepare the individuals involved, as well as other staff from the organization. The regional director proposed that the workshop be classified as an official event and that other regions and development institutions be invited to participate. He offered to provide any necessary support and instructed the administrative offices to provide the logistical support necessary to conduct the activity.

The director approved the logistic support needed for the field trips and, in some cases, issued instructions to encourage more active participation by some of the researchers temporarily reassigning their duties to other individuals. When the assessment was carried out, the staff involved were already aware of the importance of the activity as a function of the regional office proper and not something parallel to it.

When the results were in hand, a meeting was called to present and analyze those results. A technical report on the assessment was submitted to the directors of research and extension. The regional director officially sent copies of the report to the central-level authorities, thus presenting the activity as something carried out on the initiative of the regional office itself. At the central level, a meeting was held in which project staff presented the results to the directors and heads of the various programs.

The development of appropriate technologies is possible when linkages are established between farmers; in this way, the researchers can become familiar with the needs and characteristics of the farmers and thus focus their research on a search for technologies that are appropriate for them. Effective technology transfer involves linkages between researchers and extension workers, so that the latter will receive the technologies that they are to transfer on a timely basis. It also involves strengthening the linkages between extension workers and farmers so that recommendations reach the greatest possible number of farmers and in a form that is understandable to them.

Establishing and strengthening all these linkages is a task that falls to communications. For this reason, it is the office in charge of communications that must be responsible for the application of the proposed methodology. Its role is to serve as a coordinating link between researchers, extension agents and farmers to ensure that the last of these receive appropriate technologies and that they adapt and apply them correctly.

In some organizations, the communications function is not sufficiently understood or valued. Communications

THE COORDINATING UNIT: THE COMMUNICATIONS TEAM

As pointed out in Chapter I, the minimum team of individuals required to apply the methodology should consist of the following:

- a person with a background in communications, education, or extension who is responsible for the communications activity for technology transfer;
- an educator-communicator whose responsibility it is to translate the technologies to be transferred into educational messages that farmers can understand. This person would be the permanent contact with researchers and other sources of technology development;
- a graphic artist with photography capability;
- a radio producer-scriptwriter;
- a recording technician to handle radio equipment;
- two announcers;
- one printing equipment operator (mimeograph and offset); and
- an administrative assistant.

This team should be trained continuously in the methodology as well as in all aspects of its application.

are sometimes limited to dissemination of institutional messages through the mass media, or public relations and institutional image-creating functions. When this occurs, a valuable informational, motivational and training tool for transferring technologies to farmers is lost.

To enable it to apply the proposed methodology, the office in charge of communications, at the central level as well as in the regions where the methodology is to be implemented, should be strengthened and its staff trained. The results of the evaluation of the various problems, needs and capabilities of the organization, as explained at the beginning of this chapter, should be of use in deciding in exactly what way this office is to be strengthened.

Incorporating the mechanisms for applying the methodology into the organization's administrative procedures

Introduction of a technology into the farmer's production system requires that the farmer make certain changes in that system and relocate some of its components, as well as commit the corresponding cost-in terms of time, effort, or money-for its implementation. If, *for example,* the new activity requires participation of the other members of the family, the tasks normally performed by these individuals must be covered in some other way. If the new technology implies the purchase of an input, the money necessary for the purchase must be reallocated from other purchases for which it was earmarked. In other words, a new list of priorities within the production system needs to be prepared.

The way in which the new technology can be incorporated into the farmer's production system without overly affecting it is an almost decisive variable in the easiest and speediest adoption of that technology. Something similar occurs with the introduction of a new methodology into the operating system of an organization. Most organizations have established systems and assigned priorities in place. Resistance is always greater to anything attempting to modify those systems substantially.

To the extent possible, implementation of the methodology should accommodate itself to the organization's operating mechanisms and systems. If this is not possible, it will be necessary to determine to what extent the organization has the capability to modify those mechanisms and promote any changes that are necessary.

OFFERING THE METHODOLOGY AS AN EFFICIENT ALTERNATIVE

In Peru, after the first year of activities in the pilot zone and following numerous presentations to the management staff of the organization, it became clear that the impact achieved was due largely to the appropriate selection of technologies and their adaptation to the farmers' conditions. These two factors were a result of the initial assessment, which made it possible to learn about the farmers' perspective and to provide this information to the researchers. Since the extension workers have greater contact with the farmers, the organization felt that the former were actually the most appropriate channels for feedback. It was then decided that extension agents were to conduct an assessment of their territory and base the development of their work plan on the results obtained.

When the agricultural sector was restructured and the extension program was transferred to the Ministry of Agriculture, CTTA continued on in INIAA. The project was considered to be an activity for researching technology transfer strategies, operating in tandem with the research and adaptation of technologies. When INIAA was in the process of reorganization, CTTA already enjoyed a favorable image and members of its top management were included in decision making. The project offered INIAA an operating system for the development, adaptation and transfer of technologies that responded to a need of the organization. This allowed the project to continue operating within the organization.

The methodology must become the official method of the organization.

Converting the methodology into something "official" means that the organization, convinced of its usefulness and efficiency, adopts it as its own and issues guidelines for all communications and technology transfer activities in accordance with that approach. The official sanctioning of the approach is the result of some of the previously listed conditions: the effectiveness that the methodology is able to demonstrate; the way in which the individuals involved in decision making are kept informed and convinced and the way in which the organization is able to redistribute its resources to carry out the proposed activities. The sign that an approach or methodology has become official comes when its use is recommended or made mandatory in the operating norms and instructions of the organization.

When the extension program was transferred to the Ministry, it did not have a defined methodology. One of its first activities in its new location was the preparation of methodological guides and operating systems. At that time, the CTTA Project methodology was the only one that had been tested and the only one whose results had been evaluated. In addition, it offered an economical alternative at a time when funds were scarce. For these reasons, the Ministry developed an interest in the methodology. Presentations were made to the new directors of the extension programs, who visited the pilot zone of Marcará, attended a training day held with farmers, got to know the activity and became interested in it. When they developed the manual to guide their working methodology, the project's methods were recommended.

With the arrival of a new government, renewed concern was focused on the country's extension activities, which had been suspended due to lack of funds. The new directors of this program felt that one way to ensure continued operation in the future would be to make it a national level system mandated by legislation. While analyzing the first drafts of the national technology development and transfer system, the new directors acquired an interest in the CTTA methodology. The individual responsible for the system visited several of the regions where the methodology was being used. CTTA represented a good alternative to the existing situation of the extension programs, plagued by a lack of funds and political conditions that made interpersonal communications activities increasingly difficult in the field.

Application of the methodology must develop political support.

Every organization has an operating policy with several aims. To the extent that application of the methodology combines interests that are technical with those that are political, it enjoys greater support.

All agricultural organizations, whether public or private, are interested in maintaining a "presence" in the field. They have an interest in ensuring that their image among farmers is positive, and this is an indirect objective of some of their development activities in the field. Consequently, the use of mass media will always be well received by these organizations. It is necessary to balance this public relations interest in dissemination with the need to provide genuine technical assistance aimed at increasing production.

Despite the need for political support, it is counterproductive for activities to be identified with a particular political tendency or to enjoy the support or protection of

political figures. Although the organization may see some of its political interests reflected in some of the various aspects of the methodology, it is necessary to carefully separate in practice political from technical concerns.

INSTITUTIONALIZATION AT VARIOUS OPERATING LEVELS

Institutionalization of the methodology occurs on at least two levels:

- At the head office of an organization where decisions are made that affect the organization on a national level; the national office standardizes operations, establishes operating policies and determines priorities,
- At the local or regional field offices, where activities are carried out.

For purposes of institutionalization, these two levels are like two different audience segments of a communications strategy. From the national level the methodology is extended to other regions and eventually made official. From the field level the methodology is actually applied. At the national level, however, there is decision-making authority to allocate the personnel and funds necessary so that the methodology can be put into practice.

To achieve institutionalization, it is necessary to work on both levels. Management personnel at the central level must be kept informed continuously as to the progress achieved in applying the methodology. The management personnel directing the application of the methodology-researchers, extension agents and communicators-should receive continuous training in efficient management of that methodology.

It is necessary to bear in mind that, when working with the public sector, national-level personnel are generally transient. Changes are frequent at this level. Personnel are more permanent at the operating levels. What they learn and put into practice at the field level is more likely to be sustained.

STAGES OF INSTITUTIONALIZATION

For farmers to adopt a technology, they must first be assured of its effectiveness. A similar phenomenon occurs when transferring to an organization a new working methodology. If the methodology is responsive to its needs, the organization will be interested in learning more about it and agree to test it first in a pilot zone (first stage). If the results are encouraging, it will be willing to extend application of the methodology to a more widespread area (second stage). When it has become truly convinced of the results obtained and is willing to accept the activities and budgetary resources it requires, it will adopt it as its official methodology (third stage), as long as the methodology continues to be useful or until another more effective methodology evolves or appears.

First stage: demonstration, testing and adaptation of the proposed methodology

In this first stage, the methodology should be applied in a pilot zone, where it can be tested, adapted to the characteristics of the organization and given an opportunity to demonstrate its effectiveness and the way it should be managed. The objective is for the organization to become familiar with application of the methodology and for the personnel from the selected pilot zone to be trained in its application.

Application of the methodology begins with the agreement of the national office to test the methodology in a pilot zone. This agreement comes from the need the organization sees for a methodology offering a more favorable alternative for the achievement of its objectives than the one currently in use.

Organizational personnel at the regional level-regional directors, researchers, extension workers and communicators-should identify the methodology as an instrument for increasing the impact of their activities. To this personnel falls the task of seeing that the methodology is implemented correctly and develops the expected results.

Conditions for selecting the pilot zone

The proper selection of the pilot region is of fundamental importance. This region should afford conditions that make the methodology easy to apply and at the same time make it possible to generalize the lessons learned in its application.

TRAINING IN ACTION

In Peru, expansion of the application of the methodology began with training days for the heads of the communications offices in the new regions. These training workshops with theoretical-practical sessions provided them with the skills to implement the steps in the methodology.

As practical assignments for each training event, the pertinent step was implemented in the regions. *For example*, following the workshop on techniques for conducting the assessment, participants planned and implemented the assessment in their regions. When the results of the assessments were available, those results were used to train these people in development of the communications strategies for each region. Then in each region, the communications personnel applied the strategies developed in the workshop.

These conditions include the following:

- There should be sufficient institutional support; the regional office should have available personnel and resources for carrying out the technology transfer,
- Personnel should be sufficiently motivated to improve current technology transfer activities and should be interested in identifying appropriate methods for doing so,
- The region should have access to communications media that reach farmers,
- The economic and social conditions prevailing in the region should make it possible for the experience developed to be replicated in other regions.

Second stage: extension of the methodology to new regions

Based on the results obtained in the pilot zone, the organization will be interested in applying the methodology in new regions to ensure that it functions effectively under a variety of different circumstances.

The experience developed in the pilot zone should serve to adapt the implementation of the various steps in the methodology, thus making replication easier and more practical, and providing the basis for training the individuals

from the replicating regions who will be responsible for communications activities.

At this second stage, the function of institutional personnel in the pilot zone is to multiply the experience. The pilot zone can be used as a training center and its personnel as trainers of those who will eventually manage the methodology in the new regions.

It is necessary to establish in each new region the minimum team of individuals required to apply the methodology and to select the area for testing the methodology and adapting it to regional conditions. An assessment is conducted, followed by implementation of the other steps in the methodology.

Third stage: official adoption of the methodology for technology transfer in the organization

Upon arriving at this stage with the experience it has acquired, the organization elects to adopt the methodology as its own and to make the decisions necessary to organize the methodology and institute the procedures required for its institutionalization. Staff from the areas involved in the preceding stages serve as multipliers for the training provided in the rest of the country. The plans and policies of the corresponding office at the central level are thus developed on the basis of the methodology adopted.

Some considerations

The methodology should not be applied without involving personnel from the organization in its management.

To transfer technology to farmers, it should actually be tested by the farmers so that the technology can be adapted to them. Traditionally, technologies are tested by researchers, but researchers have knowledge and inputs that are unavailable to the farmers. The same thing happens in the process of transferring the methodology to an organization.

Some external projects manage their methodology by themselves, using their own resources, information and forms of organization. When they have received the results, they feel that their methodology should then be adopted by the local organization, but the characteristics of the latter, its resources, personnel and operating procedures, are entirely different.

SHARING EXPERIENCES

In **Peru**, CTTA began operating in the pilot zone on January 7, 1987. By December of that year, nine technologies for potato and corn crops had been transferred in the testing and adaptation phase. When the formative evaluation was conducted that same month, more than 50 percent of the farmers, on average, had adopted the technologies.

These results prompted INIAA to extend testing of the methodology to two additional areas of the country that had different conditions. In 1989, testing of the methodology began in Puno (in the southern highlands) and Chiclayo (in the northern coastal area).

The pilot zone was visited by personnel from the other areas on training trips. In the training workshops, personnel from the pilot zone presented their experiences, which served as practical examples for the personnel from the new regions.

In 1989, once the methodology had proven its usefulness in these new regions, INIAA decided to adopt it and extend it to an additional nine regions of the country. Once again, the experience acquired in the initial areas was used in the training workshops held for personnel from the new regions.

In 1990, the CTTA methodology was adopted by the Directorate of Research Dissemination as its official communications methodology for technology transfer. INIAA allocated the budget and staff necessary for implementing the technology at the national office and in each region.

In **Honduras**, CTTA began to implement the methodology in three extension agencies in the Comayagua region. CTTA's proposal provided the extension agents with useful tools for identifying the problems and needs of the farmers and, based on that assessment, for developing plans.

This planning process allowed the farmers themselves to play a major role designing the project. The extension services found a mechanism for systematizing their actions, which were supported by the use of mass media. In view of the results obtained, the Ministry of Natural Resources soon pressed for application of the methodology to be extended to all of the extension agencies in the Comayagua region.

The CTTA methodology was a central element in the formulation of the official extension methodology, called *Metodología Unificada de Entrega de Servicios*, or Unified Service Delivery Methodology. This methodology included the basic concepts of the CTTA methodology. This sparked an interest in seeing the methodology extended to other regions of the country. The Ministry of Natural Resources gave the Directorate of Agricultural Communications unlimited support for applying the methodology and extending its use throughout the country.

These projects take great care to build a sound organization that will make it possible to avoid difficulties that arise as a result of institutional bureaucracy. Unfortunately, such an organizational structure leads the project to isolate itself from institutional reality, to monopolize the application of the methodology to ensure its success, and to develop activities that are carried out parallel to other institutional activities, rather than combining all activities in an integrated manner.

No strategies should be designed that cannot be implemented by an organization using its own resources.

When a working methodology is proposed to an organization, the organization needs to be sure that it can cover the costs required for implementation. Although funds can be provided for testing the methodology, its implementation should be adapted to the ability of the organization to continue to apply it in the future.

One factor that makes application of the methodology appear to be more complicated is the use of sophisticated equipment and technology. The assessment, *for example,* can appear to local staff to be an extremely complicated process if computer programs to which the organization does not have access or in which its staff has not been trained are used to encode the collected data.

A similar phenomenon occurs with equipment available at the national-level office charged with implementing the activity. The inputs required for their proper functioning must be available in the country and costs must be within the future financial capability of the organization. Occasionally, organizations are provided with equipment for which spare parts are too expensive; as a result the equipment remains idle.

FACTORS THAT AFFECT THE INSTITUTIONALIZATION PROCESS

Several factors may lead to serious difficulties and delays in the institutionalization process. The three most significant are as follows:

- changes and reorganization within the organization;
- changes in the sociopolitical conditions prevailing in the country; and

- new projects having similar objectives but using different methodologies.

Changes and reorganizations within the organization

In some countries, frequent changes in the public sector occur when elections are held and/or the government changes. These may involve not only individuals but also lead to the reorganization of entire institutions.

If such changes occur when the institutionalization process has not yet been completed, they can create considerable difficulties. It becomes necessary to explain the methodology again to new people who may have different criteria for their jobs. Management again needs to be convinced of the importance of the methodology to the organization.

Adjusting to the expectations of the new leaders

When a new director takes over the organization or the office that will be responsible for application of the methodology, that person usually has an idea of what the person wishes to do there. If that person finds that the methodology is functioning and useful, it is very possible that he or she will accommodate his or her initial expectations to that methodology and immediately support the continuation of activities.

The first rule is to inform the new leaders as soon as possible about the methodology: its objectives, its achievements and its future prospects. If possible, project personnel should first determine what the expectations of the new leaders are with respect to technology transfer and communications.

Adjusting to organizational changes

The communications methodology for technology transfer proposes an integrated process. This proposal can be incorporated into research programs, extension, and communications programs or any others whose objectives involve technology transfer.

For research programs, the methodology offers useful tools for:

- generating feedback with regard to the needs and characteristics of the farmers;

- testing and adapting technologies with the farmers themselves; and
- developing strategies for transferring those technologies.

For transfer programs, the methodology offers a method for formulating communications strategies that make it possible to:

- Achieve widespread coverage in terms of providing information, motivation and training to farmers at a very low cost,
- Complement, systematize and strengthen current methods and thus increase their effectiveness,
- Evaluate the impact of the transfer and develop feedback for the development of plans.

As a result of these benefits, the methodology can be used to good advantage by technology development and/or transfer organizations, regardless of their organizational structure.

Changes in sociopolitical conditions

Changes in the economy of the country, and their influence on organizational budgets, may constitute a serious obstacle to continuing implementation of technology transfer and

SURVIVAL IN THE MIDST OF INSTABILITY

In Peru, during the four-year life of the CTTA Project, INIAA had four different directors general, and regional directors were replaced five times. The office on which the project was directly dependent had five different directors, and its structure was modified twice.

Ultimately, the agricultural sector was completely reorganized during the second year of project operations. The extension program was moved from INIAA to the Ministry of Agriculture. However, INIAA wished to keep the project under its own administration as it was a program for research in transfer strategies, complementary to technology research. The institutional objectives were strengthened by developing transfer strategies together with the technologies and delivering them to the extension programs.

IMPACT IS THE BEST "LIFESAVER"

In Peru, the prevailing economic situation made it impossible for the CTTA Project to continue to pay the costs of the radio program that was being broadcast in the pilot zone of Marcará during its fourth year of operation. But the program had gained such a large audience that the radio station, which had already been charging prices that were much lower than official rates, continued to broadcast the program without charge for quite some time. The coverage achieved by the program had made that time slot particularly valuable for the radio station in terms of all the advertising directed at the farmers.

After two years of operation, project personnel encountered serious difficulties in carrying out field work in the pilot zone of Marcará due to increased political violence. Nevertheless, the radio program continued to be broadcast and the farmers began to show up at the offices in Huaraz on their own account to pick up the graphic materials to be able to study the lessons being taught in the radio programs. Communicators took advantage of these visits to conduct many of the interviews that they previously had conducted in the field.

communications strategies. When there are budgetary cutbacks, the first activities to be curtailed are field activities, as they require the payment of per diems and the expenditure of gasoline and use of vehicles, which are increasingly scarce in some organizations. In addition, changes in the political situation can make fieldwork difficult or risky and thus prevent implementation of the activities. These difficulties are easier to overcome to the extent that results have already been obtained with application of the methodology and the corresponding strategy emphasizes the use of communications media that can be controlled by the farmers themselves.

New projects with similar objectives using different methodologies

Technology transfer is a concern of many national and international organizations. Methodologies for technology transfer are a subject of constant controversy for many professionals in the fields of communications and extension.

Sooner or later, an organization proposing that a new methodology be tested and offering financing for its applica-

tion will appear on the scene. Continuation of the CTTA methodology will depend on:

- the soundness of the system and the organization for applying the methodology,
- the degree to which the organization and its staff are convinced of the usefulness, validity and impact of the methodology.

Nevertheless, it should be borne in mind that most organizations in developing countries do not have large amounts of resources. The fact that an organization or project proposes something and in addition provides the funds for implementing it can constitute a very strong motivating factor for accepting the proposal and changing the earlier methodology.

SIGNS OF INSTITUTIONALIZATION

Following is a list of indicators that the methodology is being adopted by an organization:

- The organization budgets for program activities and allocates the necessary financing for them;
- The policies that provide for the implementation of the methodology are developed;
- Institutional objectives and plans increasingly reflect the approaches required by the methodology; the actions resulting from the application of the methodology are incorporated into the framework of what the organization considers to be mandatory in its plan; these actions are included in the organization's workplans for management;
- The organization allocates the staff required for the activity;
- The organization establishes the structural units necessary to implement the activities resulting from the adoption of the methodology;
- The duties of researchers, extension agents, and communicators include working on the application of the proposed methodology;
- Workplans for researchers, extension agents, and communicators include activities related to the application of the methodology;
- The organization is interested in extending application of the methodology to other regions, country, or other interested areas.

CHAPTER SUMMARY

The purpose of institutionalization is to prepare an organization to continue to use the communications methodology in the future. The basis for institutionalization lies in organizing and training the personnel who will be responsible for implementation of the various steps involved in the proposed methodological process.

The conditions necessary for institutionalization to take place are as follows:

- The methodology developed responds to the communications and technology transfer needs of the organization,
- The methodology is demonstrably effective,
- The methodology is adapted to the resources available to the organization,
- The methodology is incorporated into the organization's operating mechanisms.

Institutionalization involves a series of stages:

1. In the first stage, the methodology is made known and tested in a pilot area of the organization, and then adapted according to the results obtained.
2. In the second stage, the methodology resulting from the pilot experience, in which it was adapted to the conditions of the adopting organization, is extended to other organizations having different characteristics, and then adapted to those characteristics.
3. In the third stage, the organization adopts the methodology and commits itself to integrating it throughout its entire sphere of influence.

Part two:

Tools

CHAPTER IX

Social Research Techniques for Assessment and Evaluation

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INTRODUCTION

In choosing research techniques for an assessment or for an evaluation, bear in mind that no technique in and of itself is sufficient to develop the different types of information required. The ideal approach is to combine techniques that will make it possible to obtain the information and then verify that information and analyze it in depth.

OBSERVATION

Observation is the first research method. It aids in forming an idea of what to study or to confirm the results of the research. It is also useful to verify or complement data obtained using other techniques.

Observation makes it possible to perceive attitudes or detect behaviors in a way not possible using other means. *For example,* it is very difficult to analyze on the basis of a survey the ease or difficulty a farmer has in correctly applying a technical recommendation. With observation, it is possible to follow the steps the farmer takes in applying it and to see where there are difficulties.

For observation to be truly useful, it is important that a detailed record be kept of what is observed. Without this, there is a risk that the observed information will be forgotten over time or that it will become tainted with subjectivity. (*See the sample observation guide below.*)

Observation may be:

- ***Simple.*** Simple observation is carried out without precisely defined objectives. It is used to begin a research activity to become familiar with the farmers involved, to determine the status of the crops being grown and to ascertain the attitude of the farmers toward institutional personnel. It serves to focus on those issues that are important to investigate.
- ***Systematic.*** Systematic observation is performed with specific objectives in mind and begins with a planning process aimed at determining how, when and whom to observe. It is used to confirm the results of the research or for monitoring purposes, *for example,* to verify on a specific number of farms what planting distance is used, or to observe how the farmers prepare their land.

SAMPLE OBSERVATION GUIDE - Planting Corn

Place: _____
Day: _____
Time: _____
Size of plot: _____
Type of soil: (claylike, sandy) _____
Type and degree of slope: _____

ITEMS TO BE OBSERVED

1. Variety of seed _____
   (If the farmer uses mixed varieties, indicate which and in what proportion they are mixed.)
2. Estimated quality of seed _____
3. Amount of seed _____
4. Is the seed from the farmer's previous harvest or was it bought? _____
   (If bought, from where?)
5. Conditions of the land
   - *Machaco* irrigation _____
   - Rainfall _____
   - Type of plow (*manual, mechanical, animal traction*) ____
   - Number of passes made to turn the soil _____
6. How long ago did the farmer prepare the land? _____
7. Type of planting (*following behind the oxen, seed hole*) ____
   If planting is by seed hole:
   - Distance between holes _____
   - Number of seeds per hole _____
8. Furrowing (*manual, oxen, other animal traction*) _____
9. Distance between furrows _____
10. General description of activity _____
11. Number of people participating (*by sex and whether adults or children*) _____
12. Division of labor and distribution of chores _____
13. Is the whole field done on the same day or over a period of several days? _____
14. Does the farmer fertilize during planting? _____
    If so, indicate type and amounts of fertilizers used:
    N _____ P _____ K _____
    - Description of the mixture and proportions used _____
    - Type of application _____
    - How far from the seed and in what direction is the fertilizer placed? _____
    - How it is covered? (*describe*) _____
15. Is irrigation done following planting? Yes ____ No ____
    If so, volume of water and duration of irrigation (*describe*)
    _____

USING SYSTEMATIC OBSERVATION IN BEHAVIOR ANALYSIS

In the pilot zone of Marcará, Peru, some farmers with sufficient resources used pesticides to control certain corn pests. They had purchased the pesticides and the backpack sprayer to apply them. However, the pests were controlled only in certain areas of their fields; in the remaining areas, the pests remained active despite the application of the same pesticides in the recommended amounts. The farmers thought that the pesticides were of poor quality and applied even greater concentrations to achieve proper control, but with no success.

CTTA project personnel carefully observed the way in which the pesticides were prepared and applied, studying each step that the farmers took in this process:

- First they filled the backpack sprayer (15-liter capacity) with water,
- Then they poured into it the amount of powdered pesticide indicated on the label,
- Finally, with a stick, they stirred the mixture for a few seconds and then applied it.

Project staff were able to determine that the pesticide was not being mixed properly, as the product remained on top of the mixture. This meant that the first plants sprayed received only water, whereas more than half of the plants received a high concentration of pesticide, which is dangerous in the case of systemic pesticides.

Several ways of improving the mixture were analyzed and eventually a practice was defined and then presented in graphic steps in the communications materials:

1. Fill a ladle half-full with water,
2. Add the dose of pesticide recommended for the 15-liter sprayer,
3. Stir well with a stick until the mixture is uniform,
4. Place the mixture into the backpack sprayer,
5. Add water until the sprayer is full.

The analysis of the farmers' technique and the selection and testing of the new technique were the result of a number of sessions of systematic observation.

OBSERVATION AS A MONITORING INSTRUMENT

During monitoring visits made at the time of the potato harvest, project staff were able to observe that some fields had been attacked by the *gorgojo de los Andes* (Andean weevil). What struck the visitors as curious was the fact that the owners of those fields had followed the recommendations proposed by the CTTA Project for controlling that particular pest.

The instructions were as follows:

1. Turn the soil over well when preparing the land,
2. Wait a few days prior to planting,
3. When hilling, apply *granulated Volaton* around the neck of the plant,
4. Make the hills high.

By harvesting a few plants, project personnel observed that in all cases only the potatoes on one side of the stalk had been affected. The owners of the farms were asked to demonstrate step by step how they had applied the recommended pesticide, by using a handful of dirt to simulate the pesticide. The pesticide had been applied by placing a handful on one side of the plant.

The recommendation for **pesticide** application had been confused with the recommended way to apply **fertilizer** during that same hilling stage. For this reason, only one side of the plant had been protected from infestation by pest larvae. This made it necessary to modify the messages on this recommendation, by further emphasizing that it was necessary to surround the neck of the plant totally with the pesticide.

Observation is essential for analyzing farmers' current technical practices and the ease or difficulty of the proposed ones. It serves to break behaviors down into sequences so that they can be expressed graphically in training materials.

INTERVIEW

The interview consists of a conversation between two people on a particular subject or subjects. As a research technique, it is a good instrument for conducting in-depth research on opinions and attitudes. In the interview, the interviewer attempts to get the interviewee to express views without restriction or direction.

The interview requires that the interviewer be able to carry a conversation and prompt the interviewee to communicate. Dialogue must be spontaneous and lively and the interviewee should not feel pressured or distrustful. The interviewer should refrain from expressing personal views so that the interviewee will not be influenced.

The interview lasts between 20 and 30 minutes. However, if the interviewee wishes to continue to talk freely, there is no need to terminate the interview suddenly, as doing so might make the respondent feel that he or she was used merely as a source of information. The interview differs from the survey because it is possible to reformulate questions, explain questions or add additional questions that will make it possible to analyze the subject in greater detail in accordance with the information being provided by the interviewee.

The interview is very useful with extension agents, community leaders, merchants, vendors of agroinputs, institutional personnel and all types of key informants.

There are two types of interviews:

- *Open-ended.* In the open-ended interview, the interviewer poses a question and allows the interviewee to speak freely. The interviewer only occasionally asks a question to encourage the interviewee to go into greater detail or to provide a better explanation of opinions. This interview is used

INTERVIEW WITH VENDORS OF AGRO-INPUTS

In Marcará, Peru, one source of information on technology use was the vendors of agroinputs in the city and other nearby population centers. A question guide was prepared for conducting individual interviews with each vendor on topics that included:

- What consultations were made most frequently by farmers,
- What type of pest or disease was of most concern to farmers,
- Availability of agroinputs to meet an increase in demand as a result of project activities in the zone,
- Prices of the most common pesticides for each pest or disease.

THE FOUR STAGES OF AN INTERVIEW

1. **Introduction:** The interviewer greets the interviewee in a friendly way, introduces himself by clearly stating his name, and asks the interviewee for his name. The respondent is addressed by name during the entire interview.
2. **Motivation:** The interviewer attempts to ensure that the interviewee is properly disposed to answer the questions. To this end, the reason for the visit and the importance of learning his opinion are clearly explained, as is the purpose of recording the data that he will provide. In addition, he must be given assurance that the information that he is about to give will not be used for any other purposes. The interviewer should also encourage him by referring to other individuals, known to the interviewee, who have been interviewed.

   Find a place where the interviewee feels comfortable. If he has a lot of work to do and is really unable to meet with the interviewer, it is best not to insist but rather to schedule the appointment for some other time.
3. **The interview:** The interview should be conducted in an atmosphere of trust, in which the interviewee's name is repeated frequently and the interviewee is shown respect and treated cordially. No attempt should be made to discuss his views; rather, the interviewer should accept those views and not interject his own views.
4. **Conclusion of the interview:** The interviewee should be thanked for his cooperation. Restate, without exaggerating, how important it is for researchers to record the views of farmers to develop realistic plans. If possible, practical examples should be given as to how the information gathered will be used.

primarily in initial field visits to deal with general aspects of production or the life of the farmers.

- *Structured.* In this type of interview, the interviewer establishes a question guide ahead of time on the subjects to cover with the interviewee. This ensures that the same questions will be asked in all interviews.

The interview is an essential tool in monitoring, in determining the effect that communications efforts are developing on the audience and for channeling feedback from the field to the communicators, researchers and extension workers.

The number of interviews conducted varies in accordance with the number of potential informants and the number of topics to be discussed. In the assessment, it is necessary to interview the crop specialists, researchers, all of the extension agents in the area, all of the vendors of agro-inputs, the major sellers of agricultural products in local markets, the authorities from each community and a few farmers previously selected in collaboration with the area extension agent as representative informants.

FOCUS GROUP

The focus group is a meeting of no more than twelve people who are representative of the population that is the subject of the research activity. The group analyzes a particular topic based on a series of previously defined questions. Two individuals are required to manage this activity: a moderator and a rapporteur.

One individual, with thorough training in group dynamics, is responsible for encouraging the participation of everyone in analysis of the topic. This individual is the *moderator* for the meeting. Another person takes notes all of the views expressed during the course of the meeting, for subsequent analysis. This person is the *rapporteur*.

Focus groups are particularly useful for studying the views and attitudes of farmers. When the farmers see that they are supported by the rest of the group, they become more at ease in expressing their personal opinions. In focus groups, it is important for all participants to express their views.

The higher the educational level of the participants, the easier it is to get all participants to express their opinions. In focus groups held with farmers, it is sometimes necessary to directly ask some individuals to participate; in contrast, in focus groups held with extension agents, it is necessary to closely control individual participation so that all present will have an opportunity to provide their opinions.

The number of focus groups held with farmers depends on the size of the target audience and on the degree of uniformity of their characteristics in the area of operation. Ideally, a focus group is assembled in each community if the

characteristics of the audience are uniform. If there are very well-defined segments of a larger group-*for example,* subsistence farmers and higher-income farmers, or in cases where women perform very specialized duties in the farm enterprise-focus groups should be held with each segment.

FOCUS GROUP QUESTION GUIDE

1. What crop(s) do you feel is (are) most important for you? Why is it (are they) most important? Is this the crop (those crops) in which you invest more time or inputs?
2. Are you satisfied with what you harvest or do you think you could harvest more?
3. How do you think you could obtain better results?
4. At what times during the agricultural calendar do you encounter the greatest problems? What are those problems?
5. Do you receive technical assistance? Who provides it? What do you think of the technical assistance you receive?
6. Are the technical assistance recommendations you receive practical? Are they easy or difficult to implement? Why?
7. What communications media (explain with examples) reach your community? Which do you use most? Which do you like most? Which could be used to deliver messages to you? At what times or on what days could messages be delivered so that a majority of farmers would receive them?

Planning the focus group

To plan a focus group, follow these steps:

- Select topics to be discussed in depth.
- Design a question guide for the discussion of the topics (*see the sample above*).
- Assemble no fewer than eight or more than twelve participants so that the group is sufficiently representative and all will have an opportunity to express their opinions.
- Choose a site that is easily accessible. The location of the focus group meeting depends on each community. Some communities have community centers; in other communities, it may be the town hall, the school or, during daylight hours, any normal outdoor meeting place.

- Use different channels to invite the participants to attend. If the group is made up of previously selected individuals, they are visited and given anexpress invitation to attend the meeting on the day and at the time established. If there has been no prior selection of participants, the extension agent or local leaders can invite farmers to the meeting and ensure that they attend.
- Train the moderator and the rapporteur in the objectives of the focus group, in the use of the question guide and in appropriate techniques for handling the group efficiently.

Conducting the focus group

The focus group activity follows the steps listed below:

- The moderator and rapporteur should arrive punctually at their meeting with the farmers. They should not make the participants wait, much less fail to attend the meeting altogether. This would make them lose considerable credibility, make it difficult to call additional meetings and affect all subsequent relations with the farmers in that community. It should not be forgotten that farmers in these cases are forgoing productive activities to give their time.
- If, at the time set for the meeting, a sufficient number of farmers have not arrived to begin the focus group, those in charge should wait a reasonable amount of time, and then commence with those present.

RESPECTING LOCAL AUTHORITIES

The pilot zone in Marcará, Peru, included six *campesino* communities. A focus group was scheduled for each. The area extension worker visited the communities during the assessment planning stage and took a note from the CTTA Project addressed to the authorities of these communities requesting a meeting with ten or twelve farmers.

The purpose of the meetings was stated as being "to study the production problems facing each community." The authorities of each community established the date and time and assumed responsibility for inviting those farmers with time available to attend the meeting.

- The moderator should begin the meeting by thanking the participants for their attendance. The moderator should then proceed to introduce himself or herself and the rapporteur and briefly explain the reason for the meeting. The moderator should emphasize the importance of the farmers' opinions and clearly state that the purpose of the consultation is to seek information for ensuring useful and appropriate dissemination of technical recommendations to improve agricultural production in the area.
- The moderator should then ask the participants to introduce themselves and attempt to memorize the names of each, so that when talking to individual farmers during the course of the meeting, he or she will always be able to address them by name.
- Following these introductions, the moderator should begin by posing the first question to the group and encourage participation by those present. It is possible that the participants may be somewhat reluctant initially. The moderator should ask the question directly of one of the participants by name and, after hearing that person's opinion, call on another participant by name, and so on.
- The moderator should make no value judgment regarding the responses offered, but rather value all of them as important and ensure that differences of opinion originate solely from and are expressed by the group. When there are differences, the moderator identifies those views toward which a majority of the participants are inclined.
- The length of each focus group session depends on the topics to be covered and on the extent of participation by those attending. It should not last longer than two hours, so that participants will not tire.
- As problems are discussed with the group, the opinions of the researchers and extension agents on the same subject are presented to and analyzed with the farmers. The analysis of one problem often leads to others. *For example,* when discussing a particular pest, the relationship between that pest and the way in which the land is prepared, as viewed by the technicians, can be brought into the discussion. The way in which the land is prepared can then be analyzed, together with the reasons for doing it that way.

- The moderator should also present the recommendations formulated by the researchers and analyze with the farmers the feasibility of those recommendations, noting any doubts or objections they might have.
- With respect to those recommendations that involve the use of inputs, the farmers should indicate whether they have access to such inputs and whether they are able to purchase them and, in general, should identify any difficulties they might have in managing such inputs.
- If feasible, it is useful to record the entire session, so that all of the views presented can be analyzed then at greater length. If this is not possible, the rapporteur should take notes of all comments. In either case, it is important for the group not to feel inhibited because their opinions are being recorded. If the meeting is taped, it should be with the prior agreement of the participants. If notes are taken, the rapporteur should be positioned behind the group in order not to influence the statements of the participants.
- When the topics have been covered, the moderator should thank the participants for their opinions and emphasize how useful those opinions will be in deciding which technology will be of most use to the farmers, and assure them that recommendations reach them in a timely fashion.
- After the focus group has concluded, the moderator and the rapporteur will review the notes or the tape recording of the session. These will indicate the vocabulary used to deal with problems, such as the name given by the farmers to each thing and the terms used to refer to each situation. If the session has been held in the local language, it is important to note the name given in that language to each farming task and to the tools related to that task.
- Transcribing the tapes, especially if a session was held in the native language, is a very long and tedious task, and a transcription is generally not as useful for purposes of analysis as the tape itself. Analysis of the tape cassettes should be conducted by the individuals who coordinated the focus group session, and who can translate the comments. They should analyze the treatment given by the group to each topic and record all key ideas. The tape-recorded comments may be quite valuable for use in radio

A FOCUS GROUP DISCUSSION

Farmer Gomez: Last year I had a very big attack by worms; they almost ruined my entire potato crop.

Farmer Sarasola: Yes, worms are a very big problem.

Moderator Cruz: Who else has had problems with worms?

Farmer Menchaca: Most of us; some more, others less, but they affect us all.

Moderator Cruz: And why do you think this problem with the worms occurs?

Farmer Valdez: Who knows...! They are pests that are present in the field and are attracted by the potato stalks when they are young and sweet.

Moderator Cruz: And what do you do to combat them? You, for example, what do you do when you have an attack of such worms?

Farmer Jiménez: Well, if I have money I buy something to combat them, but if I don't, I don't do anything but wait until the plant grows to see if I can try to save it.

Moderator Cruz: How about you, Doña Emilia, what remedy do you use to combat worm attacks?

Farmer Menchaca: We apply *Parathion* but only when we are able to, because we don't always have the money. Now that prices have gone up, who knows....

Moderator Cruz: And don't you know of an inexpensive way to combat them?

Farmer Gomez: Sometimes ashes kill them. I mean, when the plant is still small, if you can see that the attack is just beginning, you can surround the plant with ashes and that will kill the pest. It seems that the ashes kill them if they crawl on top of them; that way they don't go near the stalk, because they can't reach it.

Moderator Cruz: The researchers say that those worms appear because their eggs remain in the earth from previous crops, and since you don't prepare your land well, you don't kill them.

Farmer Sarasola: So then, how do they say that we should prepare the land?

Moderator Cruz: You told me that you make one pass to turn the earth and you furrow and plant all in the same day. The researchers say that you need to make at least three passes, so that the earth will be mixed up well and these worms will come out into the air. Then, you should wait about two weeks before furrowing and planting.

Farmer Menchaca: But how are we going to make three passes...? That involves a lot of work with a team of oxen. For example, I don't have a team of oxen so I have to rent one. It is very expensive for me to make so many passes.

The participants continue to analyze this unperceived problem in the preparation of the land.

programs or spots as a starting point for analyzing a particular topic.

- The information gathered from the various groups and from farmers interviewed individually should be encoded and classified according to the topics covered in the assessment, for subsequent analysis.

Some recommendations for handling the focus group

- It is necessary to prevent the focus groups from being unconsciously manipulated by the moderator or any of the participants. The moderator should be aware that his or her role is merely to present the topics following the question guide and to encourage participation by all of the members of the group. The rapporteur should limit his or her intervention to taking notes or tape-recording the session. At no time should the rapporteur ever correct, much less contradict, the moderator. To the extent possible, the rapporteur should be unnoticed by the group.
- In keeping with the above, extension agents or technicians who work in the area, and are well known, should not participate in focus groups with the farmers. Their presence may prompt the participants to try to give the responses that they feel these individuals would want to hear. Ideally, these groups should be handled with only a moderator and a rapporteur, who should not be directly involved with any agricultural activities in the region and who should be unknown to the population group being studied.
- In groups, there are always people who are more influential than others with respect to the opinions of the community. They talk more, try to persuade the other members of the group to support their views, and in a very subtle way lead the group along their line of thinking. The moderator should learn to identify and neutralize this type of participant by limiting the number of his or her comments and by asking the others to express their own opinions. *For example*, when a participant begins to dominate the discussion, he or she should be asked to wait a while so that the other participants can give their views. Those who have not participated much in the discussion are personally asked to express their ideas.

THE SURVEY

The survey is a research technique for obtaining *quantitative* information to make projections for large population groups. With a survey, it is possible to cover a large number of variables in a relatively short time, but a survey does not allow for any in-depth coverage of such variables; for the latter, the survey should be complemented by the use of *qualitative* research techniques.

The decision to conduct a survey depends on the need to quantify a particular item of qualitative information. Surveys are useful for conducting analyses of media audiences, media coverage, and the use of specific technologies or technical behaviors. *For example,* to plan the availability of fertilizers in the area for the coming crop year, it is necessary to know what percentage of farmers use fertilizers. This information, cross-indexed to the types of crop and sizes of the plots of land, makes it possible to project the amount of fertilizer that needs to be available for the area.

Surveys are of limited utility for subjects involving opinions, attitudes and behaviors. In surveys, there is always the possibility that the respondent will express what he or she feels is expected. To plan and implement a survey, the following steps must be taken.

Defining of the objectives and variables

In designing the survey, it is important to have a clear definition of the objectives of the research and of the variable characteristics or factors to be studied, to determine which of those objectives can benefit most from the use of a survey.

Designing the questionnaire

In designing the questionnaire, it is necessary to select the type of questions, the content of those questions, the way they are phrased (vocabulary), their order or sequence and the organization of the questionnaire in general.

- Questions may be open-ended when the freely expressed opinion of the farmer is being sought, or closed so that the farmer must select a response from among preestablished alternatives.
- The questionnaire should contain only the number of questions necessary for analyzing the material being

studied. The questions should be stated objectively to avoid leading to a particular response.

- The words employed should be those in normal use or familiar to the farmers so that they will clearly understand the meaning of the questions.
- The sequence begins with general questions and proceeds to more specific ones. This helps the respondent to assimilate the subject matter gradually.
- The questionnaire should be designed for completion in no longer than thirty or forty minutes.

(*There is a sample questionnaire at the end of this chapter.*)

Designing the sample

Designing the sample, or group to be surveyed, involves determining two things:

- the type of sample, so that it is representative, and
- the size of sample, so that it is valid and significant enough to project results for the whole target population.

In the formative evaluation, the population group being studied is made up of all of the men and women farmers from the area selected for implementing the communications program for technology transfer. However, to study the entire population and conduct a comprehensive analysis of the large volume of data developed, considerable time, energy and economic resources are required. Therefore, a small group of farmers is selected who, with a reasonable degree of certainty, are representative of the population group under study. This selection process is known as *sampling* and the small group selected is known as the *sample.*

For the sample to be representative and for it to be possible to apply the results obtained to the larger population group, the members of the group must be selected at random and not in accordance with the personal criteria of the researcher or surveyor.

The basic requirements for ensuring a representative sample may be summarized as follows:

- The members of the sample should be selected without bias or intent by the researcher, for the data to be valid,

- All of the members of the population group must have the same likelihood of being selected.

The sample can be designed in a number of different ways; the procedure used will determine the different types of samples: *random sample, quota sample, stratified sample, systematic sample, convenience sample.*

The basic principles of the simple random sample require preparing a complete list of the population to be studied and then using statistical procedures to classify the members of the population group and select them for inclusion in the sample. Lists such as these are almost impossible to find in rural areas, and it is extremely costly and time-consuming to develop them. Sometimes it is possible to develop such a list if the population distribution is not overly dispersed. Even so, it must be remembered that such a task involves considerable work, time and economic resources, factors that frequently do not justify the effort in terms of cost-benefit or the budgetary and personnel resources available.

A middle-ground alternative for designing the sample consists of:

- preparing a map of the area;
- determining the distribution of the population;
- selecting routes that cover the geographical area and the different types of farmers residing there; and
- surveying or selecting those farmers who are located along the previously determined routes, until reaching the needed total number.

A particular farmer should not be included because he or she is well known or "a fine person." As previously indicated, when planning fieldwork, a number of different routes or areas should be defined that will allow coverage of the entire zone, providing a degree of certainty that different types of farmers are being reached for the sample.

For example, in Chiclayo, Peru, the area known as Muy Finca was selected for implementing the communications program for technology transfer. This area covers four extension sectors. The extension workers provided a map of the sectors and explained that the farmers' lands were distributed along irrigation canals and that parallel to the irrigation canal ran a usable road. Other information that they passed along was the approximate number of heads of

family in each of the sectors and along each of the irrigation canals, as well as the particular crops grown there.

With this information, the Project planned the selection of the sample by determining the roads to be traveled to ensure that the surveyors could obtain information from different types of farmers and that the results would be fairly representative of the overall population group.

Although it is easier to go to the main urban center and survey all farmers found there, such a procedure should *never* be seriously considered. This is because it may be that the farmers who live in town are financially better off. This characteristic would then skew or distort the results and not provide a representative sample.

The other factor to define in designing the sample is the *size* of the sample, that is, how many farmers will have to be surveyed for the results of the sample to be representative of the larger population group. Size is related to the similarity or differences in characteristics among the members of a particular area. Such characteristics include:

- socioeconomic factors,
- types of crops grown,
- agroecological conditions, and
- access to resources and inputs.

The greater the differentiation among the various members of the population group, the larger the sample will have to be.

For example, in Peru, the population groups studied did not exhibit a large degree of differentiation in terms of characteristics-crop management, educational level, access to resources-and were not large in size, since it is advisable not to design and test a technology transfer strategy in an overly large area. In the Peruvian project, the initial work areas contained approximately 1,500 farmers and a total of some 10,000 hectares, with a few exceptions. A sample of approximately 10 percent of the farmers in the area selected was sufficient to achieve the established research objectives.

Selecting and training surveyors

The individuals selected as surveyors must have experience in working and dealing with farmers, must be at ease in communicating with them, must speak the local language,

and must have some experience in and knowledge of farming.

The surveyors should be trained in:

- The objectives of the research, so that they will in turn be able to explain those objectives to the farmers.
- The information sought with each question included in the questionnaire and the way in which the response is to be recorded.
- The type of sample to be used and how it will be obtained.

The surveyors should rehearse using the questionnaire in a role-play activity to preview any situations that could arise.

Testing the questionnaire

Once the survey has been designed and the surveyors have been selected and trained, the questionnaire needs to be tested by trying it on a small group of farmers with characteristics similar to those of the farmers in the sample.

The purpose of testing the questionnaire is to:

- Determine whether the questions elicit the information sought.
- See whether the vocabulary and meaning of the questions are understood.
- Identify a few common responses that will make it possible to change open-ended questions into closed questions, in which the respondent would choose among several different fixed alternatives, thus facilitating encoding.
- Train the surveyors through practice in using the questionnaire.
- Anticipate potential problems and any confusion that might arise in the course of using the questionnaire.
- Measure the time necessary to administer each questionnaire, to plan the survey period.

Analyzing the test and adapting the survey

Using the results of the field test, the necessary adjustments and changes are made until the responsible personnel arrive

at a final design for the instrument. The most common changes tend to involve:

- vocabulary;
- phrasing of questions;
- converting open-ended questions into closed questions; and
- adding or deleting questions.

Implementing the survey

Planning for the task of administering the surveys involves:

- setting the most appropriate days for applying the questionnaires;
- preparing enough questionnaires for the sample number;
- preparing credentials for the surveyors;
- selecting supervisors for each group of surveyors;
- preparing maps of the work area, to facilitate deployment of the groups;
- making the necessary arrangements for transportation to the sites.

Each surveyor is assigned a number of questionnaires to complete each day, based on the time required to do the interview and the degree of population concentration in the area, which determines the ease or difficulty in reaching each farmer. During the first few days, it is important for each surveyor to have a meeting with the supervisor of his or her group after conducting a certain number of surveys, to review those surveys and get any feedback.

Implementation of the survey involves the same steps listed for the interview:

1. Introduction
2. Motivation
3. Implementation
4. Departure

Tabulating data

The data obtained are grouped by the variables studied, and a determination is made as to how many farmers have given

RECOMMENDATIONS FOR THE SURVEYOR

- Ask the questions in the exact order in which they appear on the questionnaire.
- Do not change the questions. In the event that the respondent does not understand the question, explain the question in an entirely impartial manner, taking care not to encourage a particular type of response.
- Write down the responses immediately; do not trust them to memory.
- Write the exact response given by the respondent, in his or her own words, without attempting to explain it.
- When the information being recorded is lengthy, there will a period of silence that may be disconcerting to the respondent; the surveyor should repeat aloud what he or she is writing so that the respondent will also see that the surveyor is writing exactly what was said.

a particular response and how these responses relate to other farmer characteristics. Tabulation can be done manually or with a computer program designed for that purpose. Use of a computer for this work involves resources and inputs that are not always available to offices located in the field.

To properly segment the population group that constitutes the target of the communications strategy, it is not sufficient to count the number of individuals responding in a particular way and then calculate a percentage. It is necessary to cross-tabulate the responses given to particular questions with the variables that have been selected previously as being most important.

For example, to analyze the problems of fertilization properly, it is not enough to know that 70 percent of farmers do not fertilize. It is necessary to determine the characteristics of those who do not fertilize to define the type of farmer to whom fertilization messages should be directed and relate those messages to his or her other characteristics.

Analyzing results

Analyzing the results means interpreting the data obtained from the survey. This analysis should be compared to the results obtained from other research techniques and incorporated into the final analysis of the research conducted. The

analysis of the data obtained from the assessment should make it possible to prepare the TABLE OF AGRICULTURAL PRACTICES presented in Chapter II. The results will also serve as a frame of reference for the final impact evaluation.

1	2	3	4	5	6	7	8	9	10
Current Farmer Practices	Reasons for Current Practices	Benefits Perceived from Current Practices	Cost of Current Practices	Problems Represented by Current Practices	New Proposed Practices	Reasons for Proposed Practices	Benefits Offered by New Practices	Cost of New Proposed Practices	Intermediate Behavior Alternative

CHAPTER SUMMARY

To conduct a useful assessment or evaluation and obtain reliable results, it is necessary to integrate a number of different quantitative and qualitative research techniques and to train extension and communications personnel in their use.

Techniques such as observation make it possible to analyze the current practices of farmers in managing their crops and the ease or difficulty they will have in using new practices that will be recommended to them through the communications strategy.

Surveys make it possible to project the results obtained from representative samples to larger universes of farmers. Interviews and focus groups make it possible to study in greater depth current agricultural behaviors, the reasons behind those behaviors and the views of the farmers on their problems and the technical assistance that they receive, and expect, for solving those problems.

SAMPLE SURVEY QUESTIONNAIRES FOR ASSESSMENTS AND EVALUATIONS

GUIDE FOR CASE STUDIES
CORN

I. GENERAL INFORMATION ABOUT THE FARMER

1. Complete name: _____
2. Age: _____
3. *Campesino* community: _____
4. Sector: _____
5. Knows how to read and write: _____
6. Educational level: _____
7. No. of plots of land: _____
8. Total extension of land: _____
9. Crops planted: _____

II. AGRICULTURAL MANAGEMENT FOR CORN GROWING

How many fields do you have planted to corn? _____

FROM THIS POINT ON, TAKE DETAILED DATA ON ONLY ONE OF THE CORN FIELDS:

What is the name of the field or where is it located? _____
How large is the field? (in square meters) _____
(*TO THE EXTENT POSSIBLE, MEASURE THE FIELD*)

PREPARATION OF THE LAND

Did you clear the land prior to preparing it? _____
On what date did you prepare the land? _____
How many family members worked on preparing the land? _____
How many days/hours did they work? _____
How many hired hands or friends helped you to prepare the land? _____
How many days/hours did they help you? _____
How much did you pay them per day/hour? _____
In addition to money, what else did you give them in payment? _____
How many teams of oxen did you use in preparing the land? (not including furrowing) _____
Was the team of oxen your own or rented? _____
If it was rented, how much did you pay per day for it? _____
How many passes did you make prior to planting? _____
Why did you make that particular number of passes? _____
How and from whom did you learn to make that number of passes? _____
How long have you been making that particular number of passes? _____
Have you received advice in preparing the land or planting corn over the radio or through pamphlets (guides) or training courses given in the community?
_____
What do you think about such advice? (advantages-disadvantages) _____

PLANTING

On what date did you plant this field? _____
How many days after the passes did you do your planting? _____

Why? _____
What variety of corn seed did you plant? _____
Was it your own (from a previous harvest) or purchased? _____
If it was your own, from what part of the ear did you select the seed? ____
If it was purchased: _____
How much did you pay per kilo? _____
From whom did you purchase it? _____
Was it certified? _____
How many kilos of seed did you use on that field? (in kg.) _____
How did you plant the corn? (furrows or following behind the oxen) _____
How and from whom did you learn to plant that way? _____
How long have you been planting that way? _____
At what distance between furrows did you plant? _____
At what distance between plants did you plant? _____
How and from whom did you learn to use that distance for planting? ____
How long have you been planting using that distance? _____
Have you received advice on planting corn over the radio or in pamphlets (guides) or training courses held in the community? _____
What do you think of that advice? (advantages-disadvantages) _____
How many seeds did you place in each hole? _____
How and from whom did you learn to put that number of seeds in each hole?
_____
How long have you been placing that number of seeds in each hole? _____
How many family members worked on the planting? _____
How many days/hours did they work on the planting? _____
How many farmhands or friends helped you with the planting? _____
How many days/hours did they help you? _____
How much did you pay them per day/hour? _____
In addition to money, what else did you give them in payment? _____
How many teams of oxen did you use in the planting? _____
Was the team your own or rented? _____
If it was rented, how much did you pay per day? _____
What tools did you use in planting? _____

FERTILIZATION
(Refer to the use of both chemical and organic fertilizers)
Have you fertilized or manured the corn on this field? _____
How many times have you fertilized? _____
How and from whom did you learn to fertilize that number of times? ____
How long have you been fertilizing that number of times? _____

First fertilization

When or how many days after planting did you apply the first fertilization?
_____
(ALSO INDICATE AT WHAT TIME DURING THE CROP CYCLE)
What fertilizers or manure did you use? 1. _____
2. _____
3. _____
What amount did you use of each? (kg.) 1. _____
2. _____
3. _____

At what distance from the plants or seeds did you place the fertilizer or manure? _____

How and from whom did you learn to apply the first fertilization in this way?

_____

Second fertilization

When or how many days after the first fertilization did you apply the second?

_____

(ALSO INDICATE AT WHAT TIME DURING THE CROP CYCLE)

What fertilizers or manure did you use? 1. _____
2. _____
3. _____

What amount did you use of each? (kg.) 1. _____
2. _____
3. _____

At what distance from the plants or seeds did you place the fertilizer or manure? _____

How and from whom did you learn to do the second fertilization in this way?

_____

Have you received advice on fertilizing corn over the radio or through pamphlets (guides) or courses? _____

What do you think about such advice? (advantages-disadvantages) _____

CULTURAL TASKS (Cultivation)

Irrigation

How many times have you irrigated your cornfield? _____

How many hours did it take you for each irrigation? _____

Has anyone helped you to irrigate? How many people? _____

Weeding

When or how many days following planting did you do the first weeding?

_____

How many family members worked on the first weeding? _____

How many days/hours did they work on the first weeding? _____

How many farmhands or friends helped you with the first weeding? _____

How many days/hours did they help you? _____

How much did you pay them per day/hour? _____

In addition to money, what else did you give them in payment? _____

What tools did you use to do the first weeding? _____

How and from whom did you learn to do the weeding in this way? _____

How long have you done weeding in this way? _____

Have you received advice regarding the weeding of corn over the radio or through pamphlets (guides) or courses? _____

What do you think about such advice? (advantages-disadvantages) _____

Hilling

How many hillings have you done on this field of corn? _____

On what date or how many days following planting did you do the hilling?

_____

How many family members worked on the hilling? _____

How many days/hours did they work on the hilling? _____
How many farmhands or friends helped you on the hilling? _____
For how many days/hours did they help you? _____
How much did you pay them per day/hour? _____
In addition to money, what else did you give them in payment? _____
What tools did you use to do the hilling? _____
How and from whom did you learn to perform hilling in this way? _____
How long have you been hilling the corn in this way? _____
Have you received advice on hilling corn over the radio or through pamphlets (guides) or courses? _____
What do you think about such advice? (advantages-disadvantages) _____

PESTS AND DISEASES

Gusano Cogollero
What does the *gusano cogollero* look like? _____
(THE PURPOSE OF THIS QUESTION IS TO DETERMINE WHETHER THE FARMER IS ACTUALLY ABLE TO IDENTIFY THIS PEST).
Did you have an attack of *gusano cogollero* on this field? _____
Was the attack of the *gusano cogollero* light or heavy? _____
How many days following planting did you realize you had *gusano cogollero*? _____
Have you used any product (remedy) to control the *gusano cogollero*? _____
What product have you used? _____
How many days after you realized you had *gusano cogollero* did you begin to apply the product? _____
How did you apply the product? _____
What dose did you use? _____
What amount of product did you use for the entire field? _____
How many times did you apply the product? _____
How many days did you leave between one application and the next? _____
What was the result of the application of the product on *gusano cogollero*? _____
How many people helped you to apply the product? _____
How and from whom did you learn this method for controlling the *gusano cogollero*? _____
How long have you been controlling the *gusano cogollero* in this way? _____
Have you received advice on controlling the *gusano cogollero* over the radio or through pamphlets (guides) or courses? _____
What do you think of such advice? (advantages-disadvantages) _____

Utush (ear worm)
What does the *utush* look like? _____
(THE PURPOSE OF THIS QUESTION IS TO DETERMINE WHETHER THE FARMER IS ACTUALLY ABLE TO IDENTIFY THIS PEST)
Was there an attack of *utush* on this field? _____
Was the attack of *utush* light or heavy? _____
How many days following planting did the *utush* appear? _____
Have you used any product (remedy) to control the *utush*? _____
What product have you used? _____
How many days after you became aware of the *utush* did you begin to apply the product? _____
How did you apply the product? _____

How many tablespoons did you use for each 15-liter backpack sprayer? ___
What amount of product did you use for the entire field? _____
How many times did you apply the product? _____
How many days did you leave between one application and the next? ____
What was the result of the application of the product on the *utush*? _____
How many people helped you to apply the product? _____
How and from whom did you learn to control the *utush* in this way? _____
How long have you been controlling the *utush* in this way? _____
Have your received advice on controlling the *utush* over the radio or through pamphlets (guides) or courses? _____
What do you think of such advice? (advantages-disadvantages) _____

HARVEST

Did you harvest your corn for ears or for grain? _____
On what date did you harvest the ears? Were they healthy? _____
How many sacks of ears did you harvest on this field? _____
More or less how many ears are in each sack? _____
How and where did you sell the ears? _____
How much were you paid per ear or per harvest? _____
How many kilos of grain did you harvest? _____
Where or to whom did you sell the corn grain? _____
Did you select seed from your corn? _____
How did you select it? _____
How and from whom did you learn to select seed this way? _____
How long have you selected corn seed this way? _____
Have you received advice on selecting corn seed over the radio or through pamphlets (guides) or courses? _____
What do you think about such advice? (advantages-disadvantages) _____
How many family members worked on the harvest? _____
How many days/hours did they work? _____
How many farmhands or friends helped you on the harvest? _____
For how many days/hours did they help you? _____
How much did you pay them per day/hour? _____
In addition to money, what else did you give them in payment? _____
What tools did you use to harvest the crop? _____
What amount of the harvest do you set aside for consumption? _____
What amount of the harvest do you set aside for seed? _____
What amount of the harvest is for sale? _____
What do you sell more of, ears or grain? _____
When do you sell, before or after the harvest? _____
If you sell outside the community, how much do you pay for transportation?
_____
Did you harvest more or less as compared to last year? _____
Why? _____
How much more or how much less did you harvest? _____
Has your corn this year been of better quality or worse quality than last year?
Why? _____

III. COMMUNICATIONS MEDIA

RADIO

Do you use a radio? _____
Do you listen to the radio? _____
Why? _____
Do you listen to the "*Amanecer Campesino*" program? _____
Why did you begin listening to it? _____
How long have you been listening to the program? _____
How many days a week do you listen to the program? _____
Why? _____
Which of the recommendations that have been given regarding the growing of corn do you remember most? _____
Do you think that the advice that has been given on corn is useful? _____
Why? _____
What benefits do you see in the advice provided on corn? _____
Have you used any of the advice on corn provided by the program? _____
Which advice did you follow? _____
What results did you get? _____

LEARNING GUIDE

Have you received the Learning Guide for corn? _____
When did you receive it? _____
How did you get it or who gave it to you? _____
Have you read it? _____
Why? _____
Have you read the Guide in conjunction with the radio program? _____
Which pieces of advice that you read on corn growing do you remember most?
_____
Do you think the advice that you have read on corn is useful? _____
Why? _____
What benefits do you see in the advice on corn? _____
Have you used any of the advice on corn from the Guide? _____
Which advice have you used? _____
What results did you obtain? _____

TRAINING COURSES

Have you attended any training course on corn given in the community? _
What did you learn in the course? _____
Do you think these courses are useful? _____
Why? _____

THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION!

CTTA
EEA. ANDENES-CUSCO

FORMATIVE OR FINAL EVALUATION

Survey No.: _____ Date: _____
Surveyor: _____
Place: _____ Sector: _____
1. Name of farmer: _____
2. Age: _____ 3. Sex: M __ F __ 4. Educational level: _____
5. How many people in the family? _____
6. How many in the family know how to read? _____
7. How many plots planted to:

	Crop	No. of Plots	Total Area
POTATO			
WHEAT			
BARLEY			
OTHER			

8. At what distance between furrows did you plant POTATO? _____
9. Have you heard or received any information regarding the appropriate distance between furrows when planting POTATO?
   Yes ____ No ____ (*proceed to No. 15.*)
10. How or from whom did you receive this information? (*Surveyor: read the alternatives*)
    _____ Radio _____ Neighbor or friend
    _____ Extension agent _____ Family member
    _____ Flyer _____ Other (which?:)
    _____ Training course _____ Don't know, don't remember
11. According to the information received, what is the appropriate distance between furrows when planting POTATO? _____ (cm.)
12. Did you use this distance between furrows when planting POTATO? (*Surveyor: compare the answer for question 8 to the answer for question 11 in order to verify and mark the answer*)
    ____ Yes, used it correctly ____ Said yes, but used another distance
    ____ No
13. If the answer was NO, why didn't you use this distance when planting POTATO? _____
14. If the answer was YES, what results did you get by planting POTATO with this distance between furrows? _____
15. a) Did you select the POTATO for seed? ____ Yes _____ No
    b) Were the POTATO that you used for seed healthy? _____
    c) What size were the POTATO that you used for seed? _____
    _____ First _____ Third _____ Any size
    _____ Second _____ Fourth

16. Have you heard or received any information on how to select POTATO seed? _____ Yes _____ No (*proceed to No. 29.*)
17. How or from whom did you receive it? (*Surveyor: read the alternatives*)
    _____ Radio _____ Neighbor or friend
    _____ Extension agent _____ Family member
    _____ Flyer _____ Other (which?:)
    _____ Training course _____ Don't know, don't remember
18. How did the information say that POTATO should be selected for seed? (*Surveyor: the respondent may indicate several answers*)
    _____ Select POTATO of the same variety
    _____ They should not be sick, deformed, worm-infested, cut or skinned
    _____ Of the same size, between 40 and 60 gr or 4 and 5 cm
    _____ They should have short, strong buds
    _____ Other (which?:)
    _____ Don't know, don't remember
19. Did you select your POTATO seed by following the recommendations? (*Surveyor: compare the response to question 15 to that given for question 18 in order to verify and mark the response*)
    _____ Yes, selected correctly
    _____ No
    _____ Said yes, but they were not healthy
    _____ Said yes, but they were not the right size
    _____ Said yes, but didn't use any of the recommendations
20. If the answer was NO, why did you not choose your POTATO seed in accordance with the recommendations? _____
21. If the answer was YES, what results did you obtain by selecting your POTATO seed in accordance with the recommendations? _____
22. How many times have you fertilized or manured POTATO?
    _____ One time _____ Three times
    _____ Two times _____ Don't know, don't remember
23. Have you heard or received any information on how many times POTATO should be fertilized or manured? _____ Yes _____ No (*proceed to No. 29.*)
24. How or from whom did you receive it? (*Surveyor: read the answers*)
    _____ Radio _____ Neighbor or friend
    _____ Extension agent _____ Family member
    _____ Flyer _____ Other (which?:)
    _____ Training course _____ Don't know, don't remember
25. How many times did the information say POTATO should be fertilized or manured?
    _____ One time _____ Three times
    _____ Two times _____ Don't know, don't remember
26. Did you fertilize or manure that number of times? (*Surveyor: compare the response to question 22 with that given for question 25, to verify and mark the response*)
    _____ Yes, fertilized twice _____ Said yes, but did not fertilize twice
    _____ No
27. If the answer was NO, why did you not fertilize or manure that number of times? _____
28. If the answer was YES, what results did you obtain by fertilizing that number of times? _____

29. When did you fertilize or manure your POTATO crop? (*Surveyor: the respondent may indicate various answers*)

_____When preparing the land _____During the second hilling
_____During planting _____Don't know, don't remember
_____During the first hilling

30. Have you heard or received any information as to when POTATO should be fertilized or manured?

_____ Yes _____ No (*proceed to No. 36*)

31. How or from whom did you receive or hear it? (*Surveyor: read the alternatives*)

_____ Radio _____ Neighbor or friend
_____ Extension agent _____ Family member
_____ Flyer _____ Other (which?:)
_____ Training course _____ Don't know, don't remember

32. Did that information say when POTATO should be fertilized or manured? (*Surveyor: the respondent may indicate several answers*)

_____During planting _____During the second hilling
_____During the first hilling _____Don't know, don't remember

33. Did you fertilize at those times? (*Surveyor: compare the response to question 29 to that given for question 32 to verify and mark the response*)

_____ Yes _____ Said yes, but fertilized at other times
_____ No

34. If the response was NO, why didn't you fertilize at those times? _____

35. If the answer was YES, what results did you obtain by fertilizing or manuring at those times? _____

36. What fertilizers or manure did you use for your POTATO crop? (*Surveyor: The respondent may indicate several answers*)

_____Ammonium nitrate _____Manure
_____Triple supercalcium phosphate _____Other (which?:)
_____Potassium chloride _____Don't know,don't remember

37. Have you heard or received any information as to which fertilizers should be used for POTATO?

_____ Yes _____ No (*proceed to No. 43.*)

38. How or from whom did you receive or hear it? (*Surveyor: read the alternatives*)

_____ Radio _____ Neighbor or friend
_____ Extension agent _____ Family member
_____ Flyer _____ Other (which?:)
_____ Training course _____ Don't know, don't remember

39. What fertilizers do the information say should be used for the first and second fertilization of POTATO? (*Surveyor: read him the alternatives*)

In the first fertilization

1 _____
2 _____
3 _____
8 Don't know, don't remember

In the second fertilization

1 _____
2 _____
3 _____
8 Don't know, don't remember

40. Did you use those fertilizers for your POTATO crop? (*Surveyor: compare the response to question 36 to that given for question 39, to verify and mark the response*)

____Yes, uses them correctly ____Said yes, but did not use
____No did not use any ____Said yes, but didn't use nitrate
____Don't know, don't remember__Said yes, but didn't use potassium
____Said yes, but did not use triple calcium

41. If the response was NO, why didn't you use those fertilizers? _____

42. If the answer was YES, what results did you obtain by using those fertilizers? _____

43. a) Did you have an attack of *papa curu* on your POTATO crop?

_____ Yes _____ No

b) How do you know that it is *papa curu* (*Surveyor: the respondent may choose several answers*)

_____ If the leaves have been eaten in the form of a half moon
_____ If they are dark brown in color
_____ Others (Which?:)

c) How have you combated the attack of *papa curu*? _____

44. Have you heard or received any information on how to control *papa curu*?

_____ Yes _____ No (*proceed to No. 50.*)

45. How or from whom did you receive or hear it? (*Surveyor: read the alternatives*)

_____ Radio _____ Neighbor or friend
_____ Extension agent _____ Family member
_____ Flyer _____ Other (which?:)
_____ Training course _____ Don't know, don't remember

46. How did the information say *papa curu* should be combated? (*Surveyor: the respondent may indicate several alternatives*)

_____ By making high hills
_____ Pick up by hand the adults that are sleeping during the day
_____ During the night, shake the plants into a bucket so that the *papa curus* will fall in
_____ If one *papa curu* is found for every five plants, apply insecticide
_____ Other (which?:)
_____ Don't know, don't remember

47. Did you use this advice for combating the *papa curu*? (*Surveyor: compare the response to question 43. c) with that given for question 46, to verify and mark the response*)

_____ Yes, used them correctly _____ Said yes, but only used insecticide
_____ No

48. If the response was NO, why didn't you use the advice for combating the *papa curu*? _____

49. If the answer was YES, what results did you obtain by using the advice for combating the *papa curu*? _____

50. a) Did you have an attack of *rancha* or *seca seca*?

_____ Yes _____ No

b) How do you know that it is *rancha* or *seca seca*? (*Surveyor: the respondent may indicate several alternatives*)

_____ When there are black spots on the leaves, stocks and buds
_____ When there are brown-colored, damp-looking, irregularly shaped spots on the potatoes
_____ Other (which?:)

c) How did you combat the attack of *rancha* or *seca seca*? _____

51. Have you heard or received any information as to how to control *rancha*?
_____ Yes _____ No (*proceed to No. 57.*)

52. How or from whom did you receive or hear it? (*Surveyor: read the alternatives*)
_____ Radio
_____ Extension agent
_____ Flyer
_____ Training course
_____ Neighbor or friend
_____ Family member
_____ Other (which?:)
_____ Don't know, don't remember

53. How did the information say that *rancha* should be combated? (*Surveyor: the respondent may indicate several alternatives*)
_____ Use healthy seed not affected by *rancha* or *seca seca*
_____ Make high hills so that the potatoes will not become sick
_____ When flowering is just beginning, apply fungicides such as Polyram Combi, Dithane or Antracol
_____ After flowering, apply Cupravit or Cobox
_____ Other (which?:)
_____ Don't know, don't remember

54. Did you use those recommendations for combating *rancha* (*Surveyor: compare the response to question 50 to that given for question 53, to verify and mark the response*)
_____ Yes, used them correctly
_____ No
_____ Said yes, but did not use healthy seed
_____ Said yes, but did not use fungicide

55. If the response was NO, why didn't you use the recommendations for combating the *rancha*? _____

56. If the response was YES, what results did you obtain by using the recommendations for combating *rancha*? _____

57. a) How do you know when the POTATO are ripe enough to harvest?
_____ The skin does not come off the POTATO when it is rubbed
_____ Other (which?:)
_____ Don't know, don't remember

b) How many days before harvesting the POTATO do you cut the foliage?
_____ Days

c) After the harvest, do you sort the POTATO by size?
_____ Yes _____ No

58. Have you heard or received any information about harvesting POTATO?
_____ Yes _____ No (*proceed to No. 64.*)

59. How or from whom did you receive or hear it? (*Surveyor: read the alternatives*)
_____ Radio
_____ Extension agent
_____ Flyer
_____ Training course
_____ Neighbor or friend
_____ Family member
_____ Other (which?:)
_____ Don't know, don't remember

60. What did the information say about harvesting POTATO?
    _____ Harvest when the POTATO are very ripe (when the skin doesn't come off from rubbing)
    _____ Cut the foliage 15 days before harvesting
    _____ After harvesting, select and sort the POTATO
    _____ Other (which?:)
61. Did you use the recommendations for harvesting POTATO? (*Surveyor: compare the response to question 57 with that given for question 60, to verify and mark the response*)
    _____ Yes, used them correctly
    _____ No
    _____ Said yes, but the POTATOES were not ready
    _____ Said yes, but failed to cut the foliage 15 days prior
    _____ Said yes, but does not sort the POTATOES
    _____ Don't know, don't remember
62. If the response was NO, why didn't you use the recommendations for harvesting POTATO? _____
63. If the response was YES, what results did you obtain by using the recommendations for harvesting POTATO? _____
64. Have you conducted a soil analysis? _____ Yes _____ No
65. Have you heard or received any information regarding soil analysis for growing POTATO?
    _____ Yes _____ No (*proceed to No.1. under Communications Media*)
66. How or from whom did you hear it? (*Surveyor: read the alternatives*)
    _____ Radio _____ Neighbor or friend
    _____ Extension agent _____ Family member
    _____ Flyer _____ Other (which?:)
    _____ Training course _____ Don't know, don't remember
67. According to the information or advice received, how should soil analysis be performed? (*Surveyor: the respondent may indicate several alternatives*)
    _____ Divide the land into equal plots (in terms of color, rockiness, shape, slope, heavy or light soil)
    _____ Mark 10 or 20 points in a zigzag pattern
    _____ With a straight shovel, dig a hole 20 cm deep and remove one slice of soil three by three cm thick
    _____ Put all the samples together in a clean bucket and mix well
    _____ Separate out one half kilo and place it in a plastic bag with a piece of paper containing the name and other information about the farmer
    _____ Send it to EEA. Andenes-Cusco
    _____ Don't know, don't remember
68. Have you used this information or advice for soil analysis?
    _____ Yes _____ No
69. If the response was NO, why did you not use the advice for conducting a soil analysis? _____
70. If the response was YES, what results did you obtain by conducting the soil analysis in this way? _____

COMMUNICATIONS MEDIA

1. Do you have a radio?
   _____ Yes, and it works _____ No
   _____ Yes, but it doesn't work
2. Have you ever listened to the "Andenes la Voz del INIAA" Program over the radio? _____ Yes _____ No (*proceed to No. 16*)
3. On what radio station have you listened to it? _____
4. At what time(s) have you listened to it? _____
5. How many days a week do you listen to it? _____
6. What advice or information provided by the Andenes la Voz del INIAA program do you remember? Be as specific as possible. _____
7. Do the advice and information given on the program appear to you to be useful? _____ Yes (*proceed to No. 9*) _____ No
8. If NO, why not? _____
9. If YES, why? _____
10. Do the advice and information provided in the program appear to you to be clear? _____
11. If not, why not? _____
12. If so, why? _____
13. Do you think that the advice and information provided in the program can be used? _____ Yes (*proceed to No. 15.*) _____ No
14. If not, why not? _____
15. If so, why? _____
16. Have you received a flyer like this one? (*Surveyor: show the sheet*)
    _____ Yes _____ No (*proceed to No. 25.*)
17. How many flyers have you received? _____
18. What crops were covered in the flyers? _____
19. Where did you get them?
    _____ An extension worker _____ A neighbor or friend
    _____ At a training course _____ Other (which?:)
20. Have you read them or has someone read them to you?
    _____ Yes _____ No (*proceed to No. 25*)
21. Was it easy or difficult for you to understand? _____
22. What part seemed to you to be difficult? _____
23. Why did it seem to you to be difficult? _____
24. Which advice or information provided in the flyer do you remember? (Be as specific as possible.) _____
25. Would you like to receive (or continue to receive) this type of sheet?
    _____ Yes _____ No
    If YES, why would you like to receive this type of sheet?
26. Have you recently attended a training course on agriculture in your community? _____ Yes _____ No (*proceed to No. 33.*)
27. How many courses have you attended? _____
28. What crop did the training courses deal with?
    _____ POTATO _____ Other (which?:)
29. In the course that you attended, were demonstrations performed on a plot?
    _____ Yes _____ No

30. Do you feel that the advice you received in the training course was useful?
_____ Yes (*proceed to No. 32*) _____ No
31. If NO, why not? _____
32. If YES, why? _____
33. By what means would you like to receive advice or information on agriculture?

_____ Radio
_____ Flyers
_____ Training courses
_____ All three means
_____ None of the three means
_____ Another medium (which?:)
_____ Don't know

THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION!

CHAPTER X

A Case Study: The CTTA Project in Peru

Bamboo Dam Flood

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AN EXAMPLE OF THE DEVELOPMENT AND APPLICATION OF THE METHODOLOGY

In 1986, the Instituto de Investigación y Promoción Agropecuaria (INIPA) (or The Institute for Agricultural Research and Extension), in Peru, was seeking a way to reorganize its extension program. An evaluation of the training-visit methodology, which had been in effect up to that point, showed coverage rates of less than 12 percent and very low levels of adoption of improved technologies among small farmers. Moreover, these results were obtained at a high cost, in terms of personnel and inputs, which the organization was unable to support.

The Communication for Technology Transfer in Agricultural (CTTA) Project began working with INIPA in Peru in October 1986 to test a communications methodology that would increase, using the resources available to the organization, the rates of coverage and the adoption of new and/or improved technologies among small farmers.

SELECTION OF THE PILOT ZONE AND PRIORITY CROPS

A pilot zone in the highlands was selected for designing and testing the communications methodology, since government priority was given to this region of the country. The first area selected was the Valley of Yanamarca, in Huancayo, in the central highlands. The conditions in this area were appropriate for designing and testing a methodology that might later be extended to other regions:

- It is an important center for the production of potato and grains, crops whose production the government wanted to increase.
- There were several research centers located in the area: an INIPA experimental station, a research center of the International Potato Center (CIP) and another attached to the Universidad Nacional del Centro. This ensured the availability of technologies for the crops selected.
- The region was characterized by homogeneous sociocultural conditions.
- There was a regional office of INIPA in the area, which facilitated administrative work and the tasks involved in institutionalizing the methodology.
- The prevailing agroecological conditions and the characteristics of the inhabitants made this

zone representative of the country's entire central highlands region.

Unfortunately, an increase in political violence made it necessary for the project to abandon the area after only a few months, and to propose a new site selection to INIPA.

The new area selected was the Callejón de Huaylas, in Ancash, in the northern highlands, which produces potatoes, corn and grains. This area also satisfied many of the previously listed conditions. A regional office of INIPA was in operation there, along with the experimental station at Tingua. Within the Callejón de Huaylas, a smaller pilot area was selected in the district of Marcará, covering six *campesino* communities and some 4,000 farmers who grew potatoes, corn and wheat on irrigated and dry farming lands located at different agroecological floors between 1,800 and 4,800 meters above sea level.

Work would cover the three primary crops grown in the area: potatoes, corn and wheat. These crops are grown by all farmers, on either a rotating or parallel basis, but there are times during the agricultural calendar when all three crops are in production at the same time. In addition, these crops fitted well with the policies and priorities of both the organization and the government.

The CTTA Project began its activities in this new pilot zone in January 1987.

ADMINISTRATIVE ORGANIZATION OF THE PROJECT IN THE ZONE

INIPA assigned responsibility for implementation of the project to its Office of Technical Communications, whose director became responsible for the project on a national level as counterpart to the CTTA advisors from the Academy for Educational Development (AED). The individual responsible for the project in the region was the Director of the Center for Agricultural Research and Promotion (CIPA), a regional office of INIPA.

The Office of Technical Communications of this regional office was charged with implementing the project in the zone, with advisory assistance from the AED staff. This office was staffed with two agricultural communicators, one illustrator, two radio announcers, one printing equipment technician and one secretary. With this staff, the office produced and broadcast a daily 20-minute radio program over one of the stations located in the region, and produced numerous pamphlets on

agricultural topics. The lack of an evaluation of these activities made it impossible to determine their actual impact among the farmers in the zone. For purposes of implementing CTTA activities in the region, the organization added to its Office of Technical Communications an additional illustrator and a full-time radio announcer-producer.

AED assigned a long-term advisor, and Applied Communications Technology (ACT), the firm responsible for evaluation, also assigned an advisor who, beginning in 1988, was incorporated into the AED team as the project social science specialist in charge of assessment and evaluation activities.

In Marcará there was an extension office with an agent who covered the six communities in the area. CTTA assigned primary importance to training institutional extension and communications personnel to implement the steps of the methodology and to handle the corresponding activities. CTTA also provided training in the skills necessary to ensure efficient use of communications media, primarily radio and graphic materials. This training was also extended to personnel from other development organizations operating in the region.

IMPLEMENTATION OF THE ASSESSMENT

The assessment began in January 1987 with a review of existing agronomic, socio-economic, population and cultural studies that had been conducted in the region. The first meetings held with the researchers provided an initial idea of the progress in research on the selected crops and the primary production constraints in the zone. In the view of the researchers, most of the problems were the result of very low levels of knowledge and use of improved technologies by the farmers. Low levels of extension coverage were blamed for this. An analysis was also conducted, in collaboration with the researchers, of the supply of technologies available to address the problems identified and the prospects for adapting them to the characteristics of the region and of the farmers.

Subsequent meetings with the extension agents served to highlight their views on production problems, as well as on the obstacles preventing them from covering their assigned areas. They cited the lack of coordination with researchers, which consequently led to information gaps and delays in the availability of appropriate technologies for transfer to the farmers.

Initial visits to the area revealed more about the farmers' general perceptions of major problems, as well as their outlook regarding possible solutions to those problems. Thus, a general idea was obtained as to the problems perceived by both technicians and farmers, each from their own particular perspective.

Based on the results of these initial meetings, project personnel defined the specific subjects on which to focus the more in-depth research on production problems and farmer traits and practices. Quantitative techniques, such as surveys, as well as qualitative techniques, such as observation, focus groups and open-ended interviews with key representatives, would be used to collect information from the farmers in the area. Survey instruments were prepared for each of these techniques.

It would be preferable to conduct the surveys in Quechua, the language of the farmers, so they would better understand the questions and express their views more freely. This made it essential that the interviewers and all staff members who would be conducting research be selected carefully. An invitation was issued to students in the schools of agronomy and social sciences at the university and at the Technical Institute in Huaraz, capital of the department of Ancash. A selection was made of those who demonstrated ability in the Quechua language and in their interaction with farmers, together with some degree of experience in information gathering in the field.

The individuals selected were trained in the objectives of the research activity and in the use of various techniques and instruments. These instruments, which included questionnaires and guides, were written in Spanish, but they were to use them in Quechua and fill them in by translating responses into Spanish. As a practical exercise for the training activity, the instruments were tested on a small sample of farmers and, based on the results of that test, adjustments were made to ensure optimum comprehension and utility.

The data gathered in the field were reviewed and tabulated on a daily basis and the entire information-gathering process required a little more than one week. The analysis of the results was presented and discussed with researchers and extension agents to determine the problems to be addressed in the transfer activity and the technologies to be promoted for each period in the production cycle of each priority crop.

FORMULATION AND IMPLEMENTATION OF THE STRATEGY

Content

For the three target crops, technologies were chosen in relation to:

- soil preparation for planting;
- seed selection;
- planting distances between furrows and between seeds;
- fertilization: when to fertilize and how much fertilizer to use;
- cultivation tasks: hilling, irrigation, weeding;
- prevention and control of the most important pests and diseases;
- timely harvesting and storage.

The researchers were consulted continuously about the information disseminated through various media, to ensure its validity. Similar consultations were made with respect to the adjustments resulting from field-testing the technologies.

Stages

The strategy was divided into two stages, with each corresponding to the integrated production cycles of the three crops. The objective of the first stage was to promote the technologies among the farmers, so that they could be tested and adapted to the farmers' ability to adopt them and put them into practice effectively. This promotional activity also served to design and test graphic materials and radio formats which, once they had been adapted to the level of interest and understanding of the farmers, were produced and disseminated on a massive scale during the second stage.

In this way, in the combined cultivation cycles of the three crops (from June of one year to June of the following year), it was possible to test and adapt the technologies as well as the elements of an effective communications strategy for transferring those technologies. This transfer would begin on a massive scale during the second stage, based on the next crop cycle.

Communications media and materials

The researchers were asked to prepare guides for each crop, to be used for training the extension agents in the area. These guides contained all of the technical recommendations for improved management of each stage of the crop. The objective was to provide the extension agents with uniform information that would enable them

to offer uniform recommendations on a given problem.

The assessment indicated that 85 percent of the farmers in the pilot zone had access to radio. When asked about their preferences of communications media to receive information on farming, 73 percent asked for written materials, such as pamphlets. Although the illiteracy rate for the area was approximately 40 percent, 88 percent of the families had a family member who could read the materials to the others. In addition, the farmers' preference for written materials is due to the fact that such materials can be consulted whenever necessary and, in the event that the farmer is unable to read, there is usually someone who can read them. In addition, the INIPA Office of Technical Communications in the region was already broadcasting radio programs and producing graphic materials, although as already mentioned, without a definite method or strategy and with no evaluation of the impact of their efforts. The systematic use of radio and graphic materials, within the framework of a carefully designed strategy, did not involve new expenses for the organization but rather the reprogramming of existing resources for achieving the greatest degree of effectiveness and impact.

In the first stage of the strategy, flyers were produced for promoting each of the technologies. These flyers were mimeographed sheets that contained a sequential breakdown of the way in which each technology or agricultural practice was to be performed. This material, cheap and easy to produce, made it possible to deliver the technologies to many farmers and, in addition, to use them to evaluate which were the most appropriate visual and graphic codes-drawings, typefaces, formats-to use to achieve the best possible transfer of each particular technology. Drawing on this experience, project personnel were able to produce, during the second stage, *Learning Guides* for each crop.

Distribution of graphic materials in the first stage made it possible to test and evaluate different distribution channels until eventually the most effective combination was found for delivering the materials to the largest possible number of farmers.

In the first stage, daily radio spots were also used to promote the technologies and farming practices corresponding to each stage of the crop cycle, and weekly radio programs were used to explain the technologies promoted in the flyers. Radio work carried out during this stage made it possible to test a

number of different formats, characters and music for producing more effective programs during the second stage. Thus, *for example*, radio characters were created who eventually became quite famous and credible to the farmers in the area. The use of Quechua was also gradually incorporated into the radio spots and programs until eventually they were broadcast entirely in Quechua during the second stage. Also in the second stage, daily 20-minute radio programs were broadcast in a number of different formats to provide training in the management of the technologies and to reinforce their adoption and correct application.

In the second stage, using proven radio and graphic instruments, the strategy took the form of a distance education course based on the Learning Guides and radio programs. The farmers received the Guides through the various distribution channels that had proven to be efficient, and studied their lessons guided by the so-called "instructional" radio programs. These instructional programs were complemented on subsequent days by "reinforcing" follow-up programs, in which any doubts arising from the feedback received from the field were clarified.

The distance education course made it possible to deliver the technologies to many farmers at low cost. Parallel to this activity, group training events were scheduled in the communities at key points during the crop cycle, to support the learning of crop management at those particular times. These training sessions were attended by equal numbers of men and women from the communities. The extension agents continued their individual and group training activities and established demonstration plots to handle the technologies being promoted and the results to be obtained from their use.

This complementary integration of individual, group and mass media delivered, in an efficient and timely manner, the training in technology management to increasingly large groups of users.

THE RESULTS

Ongoing monitoring of the receipt, comprehension and acceptance of the recommendations being promoted was done through periodic field trips. The farming practices of the farmers were observed and proposals for new or improved technologies and practices were analyzed in collaboration with the farmers. In addition, these field visits served to record any

doubts that the farmers had with respect to the new practices, so that they could be addressed in the radio programs.

The first formative evaluation, conducted at midpoint in the first stage, showed that despite the fact that the strategy was still in the adjustment stage, *exposure* to the nine technologies promoted to that time went from 10 percent of farmers, in the case of the taking of soil samples (an activity that was entirely new for the farmers), to 70 percent in the case of the proper way to prepare the land for planting potatoes. 52 percent of the farmers had received the recommendations disseminated up to that point. *Adoption* of those technologies ranged from 5 percent in the taking of samples for soil analysis to 55 percent in the proper preparation of the land for planting potatoes.

Of the technologies adopted, certain ones stood out, such as the use of correct distances when planting corn, which increased from 4 percent of farmers who did so as of the date of the assessment to 43.5 percent. Of those, 16 percent had applied it correctly as of the date of the evaluation. Another practice that showed a dramatic increase in adoption was fertilizing corn twice, once during planting and once during hilling. This practice went from 2 percent as of the date of the assessment to 44 percent who had correctly adopted the practice at the time of the evaluation.

The second formative evaluation, conducted at midpoint of the second stage, showed that an average of 67 percent of the farmers had received the 17 technologies promoted as of that date and that an average of 48 percent had put them into practice. *For example,* the recommendation that corn be fertilized twice went from 44 percent acceptance as of the first evaluation to 53 percent following the second evaluation.

EXTENSION OF THE USE OF THE METHODOLOGY

The above-mentioned results led authorities at INIPA to decide, in 1988, to extend use of the methodology developed by CTTA to two new regions, one in the northern coastal area (in the department of Lambayeque) and another in the area of the southern highlands (in the department of Puno). The objective was to validate the methodology and test its effectiveness in these two new locations.

In the two new regions, the activities also fell under the responsibility of the Offices of Technical Communications. In both regions

local teams were trained in the proposed methodology as the individual steps were being implemented. Implementation of these steps followed the same pattern used in the pilot zone of Marcará.

In 1989, use of the methodology was extended to nine additional regions. To train the teams in charge of the activity in the new regions, CTTA advisoers designed a series of theoretical-practical training workshops on the different steps in the methodology. At these workshops, representatives from the regions were brought together in selected cities to receive training corresponding to the particular step of the methodology that they were to implement. They then returned to their own areas to train their personnel and implement the step with them. In this way, the regions carried out their own assessments and designed, implemented and evaluated their own strategies.

An effort to carry out private agricultural research and promotion activities led the Government of Peru to create the Fundación para el Desarrollo del Agro (Foundation for Agricultural Development, or FUNDEAGRO). CTTA provided its experience and methodology to the organization of private technology transfer enterprises and to promotion of the use of improved seeds among producers around the country, in support of the Regional Seed Committees created by FUNDEAGRO.

INSTITUTIONALIZATION

INIPA, now reorganized as the Instituto de Investigación Agropecuaria y Agroindustrial (Agricultural and Agroindustrial Research Institute, or INIAA), formally adopted CTTA as an institutional project for research and development of technology transfer strategies. Responsibility for its implementation was assigned to the Office of Research Planning, and the regional offices received the funds necessary to implement activities.

AED technical assistance terminated in September 1990, and all activities were turned over to the institutional staff, who have taken it upon themselves to continue to conduct the necessary training for regional personnel joining the activity and to apply the methodology to new crops and breeding activities.

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