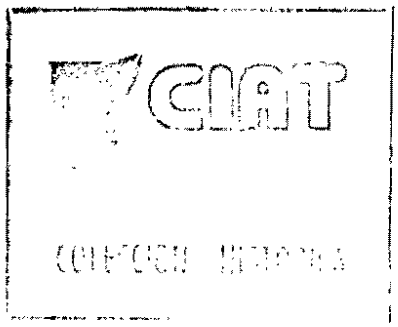

FARMER EVALUATIONS OF TECHNOLOGY. A HANDBOOK

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WHY CONDUCT FARMER EVALUATIONS IN AGRICULTURAL RESEARCH

A seed, a plant, a handful of soil, a channel of water, a bag of fertilizer, each is one of many elements of agricultural research. Each is seen and analyzed in different ways by the many people who manipulate them to develop new technology for increasing the world's food supply.

Yet often newly developed technology is not used by farmers in a way that scientists expect. Anecdotes abound of agronomic recommendations ignored, of equipment not adopted, of new crop varieties rejected by farmers. Paradoxically, other new practices not recommended by scientists have escaped from agricultural research stations and passed rapidly from farmer to farmer. Often these farmer-initiated activities have been unanticipated by professionals in technology development and transfer. This phenomenon has made professionals uneasy. Many feel that there is an element missing in the research procedures that they use to develop technology for small farmers: the active participation of the farmer.

What is special and important about the farmer's perspective? Professionals in the many scientific disciplines are trained to specialize in understanding one particular fragment of an agricultural problem. But no one specialist knows as intimately as the farmer all the many different problems and needs of the small farm household. Therefore, no other specialist is better equipped to visualize how to put a technology to work on the farm to meet those needs. The farmer is the one who finally decides whether or not a new technology is useful.

TABLE 1

FARMER EVALUATIONS TELL YOU:

- Which features of a technology farmers consider important.
- How farmers rank alternative technologies in order of preference.
- Why farmers prefer one technology over another.
- Whether farmers are likely to adopt a new technology.

The objective of this handbook is to provide techniques for conducting evaluations of new technology with the missing specialist: the farmer. The handbook is designed to help on-farm researchers enlist farmers as active participants in evaluating new technology. Achieving effective farmer evaluations depends on procedures which place the farmer squarely in the role of a colleague in the technology testing process. In the evaluation procedures discussed in this handbook, the farmer acts not as a passive object who is studied and measured, but as a subject who studies, measures, and critiques in partnership with other on-farm researchers.

Researchers who want to mobilize the expertise of farmers for technology testing need special techniques to enlist farmers in actively applying their own decision-making criteria to the evaluation process. The decision that a new technology is a workable alternative to customary ways of farming is more than purely technical, for it requires a holistic grasp of the human needs which farming is intended to meet. The small farmer intuitively knows this decision-making approach, because he has used it ever since childhood. He or she knows that this approach involves complex trade-offs among many different objectives and

TABLE 2. Examples of small farmers' objectives which determine how they evaluate new technology.

- The need for timely food supplies all year round to feed the family, as well as to increase overall production.
- The need to plan farming to include insurance strategies for bad times. This can cause farmers to think in terms of safety first, instead of maximizing gains to production.
- The need to get the most return possible out of scarce land or capital, even if it means working for very low return to time invested.
- The need to minimize time spent on any given task at a season of peak activity, such as when the rains and planting begin.
- The need to organize the time of each household member among many different tasks, so that all the necessary work gets done.
- The need to contribute to the social life of the farm community, in weddings or funerals for example, that ensure acceptance and support of the family from the community.
- The need to share resources with other members of the farm community, so that they in turn will assist the family in times of need.
- The need to provide for short-term (day-to-day or week-to-week) requirements as well as for the long-term survival of the farm household.
- The importance of meeting the needs of family members other than those directly related to farming, such as childbearing and child care, health care, and education.

needs such as those illustrated in Table 2. This handbook provides techniques that get the farmer to articulate how he or she perceives a technology in light of such management principles. An effective farmer evaluation enables researchers to map these perceptions with systematic data, so that they can readily communicate this information to technology designers, who need to understand the farmers' point of view about the usefulness of a new technology.

On-farm research which involves small farmers in testing and evaluating technology has received increasing emphasis in agricultural research and extension programs concerned with

introducing the small farmer's point of view into the assessment of technology. Agronomic and economic analyses are necessary for evaluating the results of experimentation and other research on-farm so that recommendations can be made. And, because it is recognized that agro-economic analysis is incomplete when it comes to getting a full understanding of the criteria farmers will use to decide whether to adopt or reject recommendations, it is sometimes suggested that farmers' opinions and reactions to technology tested on farm be assessed.

However, a systematic treatment of how to obtain this type of information with farmers is not available to on-farm researchers. Hence this handbook.

WHO CAN USE THIS HANDBOOK ?

Understanding the research techniques and communication skills discussed in this handbook is important for a broad spectrum of professionals engaged in agricultural research and extension, even though not all of them will be actively engaged in face-to-face contact with the farmers evaluating technology.

A first group that might use this handbook is that of research managers and supervisors of field staff carrying out the on-farm research activities covered in this handbook. These professionals need to be aware of the implications of carrying out farmer evaluations for allocation of resources and management of staff time. They should also realize what techniques are involved in building relations of trust and mutual confidence with farmers, the basic requirement for effective farmer evaluations. Skillful management of the information that can be generated by farmer evaluations requires putting the right people together at the right time and place to carry out and report evaluations so that technology designers keep in touch with farmers' reactions to proposed agricultural innovations.

A second group is that of researchers in commodity or disciplinary programs who may not be directly engaged in on-farm research, but who can certainly benefit from the information acquired from farmer evaluations. They should realize how research oriented at solving farmers' problems can benefit from the use of the techniques discussed below at various stages in the testing and evaluation of new technologies.

A third group is that of on-farm researchers and extension personnel who are responsible for testing the recommendations derived from research conducted on experiment stations. These professionals are most likely to actively apply the techniques discussed in this handbook, or to train and supervise field staff who do on-farm trials and engage in dialogue with farmers.

All these professionals are collectively referred to in the text as "researchers" to emphasize that farmer evaluations involve research on farmers' preferences, and not convincing farmers to adopt technology.

II. WHEN TO CONDUCT FARMER EVALUATIONS IN AGRICULTURAL RESEARCH

FARMER EVALUATIONS AT DIFFERENT STAGES OF RESEARCH

Farmer evaluations are not a substitute for careful agronomic and economic evaluation of technology, but are an essential complement which provides information on how farmers weigh agronomic, economic, and socio-cultural considerations to arrive at their own conclusions about the usefulness of a new technology in their particular farming circumstances.

An agricultural research program proceeds through several different stages which can be broken down as follows:

DIAGNOSIS:	Identification of objectives, needs and problems.
PLANNING AND DESIGN:	Setting priorities among problems; definition of potential solutions; formulation of strategy to test solutions; design of prototype technology.
EXPERIMENTATION:	Testing and evaluation of prototype technology, resulting in developed technology.
ADAPTATION AND VALIDATION	Developed technology is further tested, and adapted to many location-specific circumstances, resulting in recommendations for use.

In applied agricultural research for technology development, these different stages are conducted both on experiment stations and on farms.

Most agricultural research programs involve evaluation of a large number of alternative prototype solutions to farmers' problems. Those solutions usually include numerous new plant varieties, different planting densities, pest and disease controls, or other components. These are screened selectively to identify the most promising options. This selective screening usually begins on-station with a large number of options, which are progressively eliminated until a reduced number are introduced into on-farm testing: this is "developed" technology. Thus by the time on-farm trials are planted, the majority of "prototype" options have usually been discarded, and farmers are only exposed to those few well-developed alternatives that appear most promising from the researchers' point of view. The risk of this approach is that researchers may already have excluded from the on-farm evaluation process technological options which may appear promising from the farmers' point of view.

The objective of farmer evaluations as discussed in this handbook, is to provide feedback to researchers about farmers' criteria for deciding whether and how to use a potential innovation. For this reason, the earlier in the technology development process that farmer evaluations are conducted, the more likely it is that farmers' and researchers' ideas about desirable features of a technology will coincide. Even if they have made an excellent diagnosis of farmers' problems, what the researchers believe the farmer thinks or needs is not necessarily what the farmer actually does think or need. Farmer evaluations are a method for eliciting directly from farmers what they think of a proposed technological innovation, independent of researchers' assumptions.

It is worthwhile to consider therefore, the pay-off in terms of feedback to research of conducting farmer evaluations at different stages in the overall process of screening technology. We can broadly define the following stages in this process:

1) Early evaluations of many alternatives or "prototypes".
2) Comparison of fewer alternative prototypes to arrive at developed technologies.
3) Evaluation of developed technology during validation or early transfer.

Early evaluations of multiple alternatives

Farmer evaluations of "prototype" technology at an early stage of the screening process can help researchers to sort out the "very good" and the "very bad" options from the farmers' point of view. Although, researchers are likely to be screening technologies for broad adaptability, while farmers are concerned with site-specific criteria, there is evidence that small farmers share broadly comparable objectives which lead them to identify desirable characteristics of technology in common. Analysis of farmers' reasons for discriminating a good or bad technology can identify important objectives which should be considered in the early stages of screening. Such diagnostic farmer evaluations may be conducted in exploratory on-farm trials, regional trials planted on farms, or farmers can be brought to the research station to evaluate prototype technology on-station, as appropriate.

Comparisons of a few promising alternatives

At a stage in research when a few alternatives to farmers' current technology have been identified, more detailed evaluation is possible. Comparisons can help determine not only what farmers perceive as promising, but also why farmers perceive one alternative as more appealing or less appealing than another. Ideally, the few alternatives introduced into on-farm testing for detailed comparison should have been pre-screened with farmer evaluations at a prior stage in research.

Evaluation in the early stages of transfer

Once farmers have begun to apply new technology on a semi-commercial scale, the researcher can carry out farmer evaluations by comparing the new technology with farmers' conventional practices.

Evaluations of agronomic or varietal trials in farmers fields are the main focus of this handbook. However, the same principles and techniques can be applied to conducting evaluations with farmers in other sites (such as the experiment station, for example) and of various types of technology. The important principle is to give the prospective user -- the farmer -- an opportunity for hands-on evaluation of the proposed innovation. The earlier this is done, the more likely the final product - the developed technology - is likely to meet farmers' criteria for acceptability.

FARMER EVALUATIONS IN DIFFERENT TYPES OF RESEARCH PROGRAMS

Whenever agricultural scientists have to make a choice among alternative features in the design of a proposed innovation which will affect how farmers make use of it, it is helpful to know how the user will react to it. This means that farmer evaluations can be usefully applied at different stages in the technology generation process, as discussed above. It also means that the methods discussed in this handbook can be flexibly applied in various institutional contexts. Farmer evaluations can be equally useful for evaluating specialized components within a disciplinary or commodity research program, as for evaluating adaptive on-farm trials carried out by a farming systems program for example.

Farmer Evaluations and Farming Systems Research

Farmer evaluations are an important procedure for farming systems research which aims to develop locally-adapted technology tailored to the needs of homogenous groups of farmers. On-farm testing is a major activity in farming systems research, and farmer evaluations can provide useful feedback for the formulation of recommendations and the selection of components for inclusion in future trials. It is undesirable to restrict farmer evaluations exclusively to farmer-managed trials, which may be carried out at a relatively late stage. Much information useful to farming systems research can be generated by involving farmers in evaluating technology about which researchers are developing hypotheses or ideas, and which may exist only in prototype form in exploratory trials or on experiment stations.

Farmer Evaluations and Disciplinary or Commodity-oriented Research

Techniques for carrying out farmer evaluations can usefully be applied on behalf of disciplinary or commodity-oriented research programs. The examples of farmer evaluations in this handbook were compiled from experiences in commodity-research programs. For example, it may be of interest to entomologists to evaluate farmers' reactions to several alternative methods of pest control in the process of planning an integrated pest management strategy. Soil scientists and agronomists can obtain much useful diagnostic information about farmers' soil fertility management by using the techniques discussed in this handbook to carry out farmer evaluations of their local practices, soil types and fertilizers. Farmers' reactions to a breeder's nursery or trial, which includes varietal types that exhibit the different characters breeders may be considering for incorporation into a character improvement research program, can help breeders to identify those varietal characteristics most (or least) likely to gain acceptance among farmers.

Whatever the institutional arrangement that makes it possible to routinely carry out farmer evaluations, information on farmers' reactions and opinions can be a vital element in helping to orient any research program.

Farmer Evaluations and Farmer Participation Research

Farmer participation research is a set of methods designed to enable farmers to make an active contribution as decision-makers to planning and executing agricultural technology generation. Farmer evaluations are a sub-set of these participatory methods.

TABLE 3. The application of farmer evaluations at different stages in research.

STAGES OF RESEARCH:	FARMER EVALUATIONS:
DIAGNOSIS: Identification of objectives, needs and problems.	. Identify farmers' criteria for choosing among currently available technologies to understand their decision-making.
PLANNING AND DESIGN: Setting priorities among problems; identifying potential solutions; design of "prototype" technologies; and strategy to test these.	. Identify farmers' reactions to "prototypes", to obtain criteria for prioritizing which prototypes to test.
EXPERIMENTATION: Testing and evaluation of prototype technology resulting in developed technology.	. Identify farmers' criteria for choosing among alternative technologies being tested, to select the most promising ones from the farmers' point of view.
ADAPTATION AND VALIDATION: Developed technology is further tested, resulting in recommendations for use.	. Verify farmers' reactions obtained earlier, by comparing new technology to current practices, to ensure acceptable recommendations.

Farmer evaluation methods can be applied at different points in the sequence outlined earlier: diagnosis; planning and design; experimentation; adaptation and validation, as summarized in Table 3. Farmer evaluation methods can be applied in the

diagnosis stage, to help farmers' articulate their criteria for making decisions among alternative technologies currently available to them eg. choices among crops, among varieties, among tillage practices.

In the planning stage farmer evaluation methods can be applied to pre-screen "prototype" technology with farmers, thus enabling farmers and scientists to decide jointly what technology to test.

Once trials have been planned with farmer participation, farmer evaluations enable researchers and farmers to generate and share systematic information about farmers' reactions to the performance of technology in trials.

In the stage of adaptation and validation, farmer evaluations should be continued to verify the opinions and criteria for selection obtained in earlier stages of research. Evaluations by farmers at this late stage can be important for analyzing decision-making criteria and features of technology that can be readily identified only once technology is applied on a semi-commercial scale.

FARMER EVALUATIONS AT DIFFERENT STAGES IN THE CROP SEASON

When deciding at what stages in the crop season to carry out farmer evaluations, a researcher must consider the extent to which farmers will be able to remember differences among the alternatives being evaluated. A rule of thumb is: the more numerous the alternatives that the farmer is expected to evaluate at one interview, the less reliable the farmer's recall is likely to be.

At an early stage in a research program, numerous alternatives are being explored and little is known about farmers' criteria. Therefore, farmer evaluations of numerous options conducted at this stage should concentrate on the one or two key features of the technology which are apparent at each critical stage in crop development. For example, in evaluation trials including cassava varieties it has been useful to have farmers evaluate plant architecture and susceptibility to pests and diseases at weeding time, while root quality and yield are the focus of evaluation at harvest-time. Farmer evaluations obtained in this way are more reliable than if the researcher asks the farmer to remember all the features in one single interview.

Evaluations while the crop is in the field

When researchers are interested in learning about farmers' reactions to features such as plant architecture, vigor, resistance to pests and diseases, relations among associated crops, relative earliness or lateness of plant development, and specific management requirements, they can carry out farmer evaluations while a crop is still standing in the field. Evaluations of the standing crop at critical stages in its development are particularly useful in exploratory research when little is known about farmers' criteria, because such evaluations provide insight into how farmers look at a crop, i.e. what the farmer sees and thinks is important. The information obtained in this way can be indispensable for designing an evaluation interview on the final results of a trial.

Evaluations after harvest

In timing farmer evaluations of the final results of trials, the researcher needs to consider the need for farmers' opinions of features other than yield, such as the commercial and

post-harvest processing qualities of the crop. In order to give a complete evaluation of the final results, farmers may need time to process and consume samples, as well as to take samples to market so as to assess prices and the receptivity of buyers.

Different people in the farm household or farm community may need to be consulted for evaluation of commercial or post-harvest processing characteristics, if responsibility for these activities rests with individuals or groups other than the cultivator who manages the crop. For example, women often have major responsibilities for processing or marketing crops cultivated by men, and should therefore be consulted.

When post-harvest aspects of the technology are likely to affect farmers' opinions about its acceptability, researchers may want to conduct separate evaluations of marketing and post-harvest processing with the people concerned. In some instances it may be desirable to allow the cultivator sufficient time to interact with others responsible for marketing or post-harvest processing, so that he or she can assimilate information about such aspects of the new technology before giving a final evaluation. When such information is important, evaluations conducted at the time when a trial is harvested will be incomplete, and may be misleading.

One final evaluation conducted after conclusion of a trial relies heavily on accurate recall, and is therefore less suitable for exploratory work when larger numbers of alternatives are being evaluated. However, one evaluation conducted two or three weeks after harvest of an on-farm trial can be sufficient to identify the main criteria farmers use for discriminating among relatively few alternatives. In this instance, farmers will recall features such as plant architecture, management aspects, yield, or others which form their criteria for deciding whether to accept or reject an alternative.

III. THE SOCIAL DYNAMICS OF FARMER EVALUATIONS IN DEVELOPING COUNTRIES

The success of any research program in generating improved technology for farmers necessarily depends on good collaboration with farmers. But obtaining useful farmer evaluations of technologies demands a particularly high quality relationship of trust and confidence between the researcher and the farmer. This is especially so because each may have views or expectations of the other that may distort or impede communication.

Unlike plants, people change their behavior based on how they understand a situation. Most people speak differently to close friends than they do to their boss at work, or to a distinguished visitor.

When farmers are talking to researchers or extension agents, they are often acutely conscious of being in a very special social situation. The researcher will often be a social superior in many respects. The researcher will usually be more educated than the farmer, and will often use different words, scientific terms which the farmer is unfamiliar with. Frequently these differences will be visible in dress, with the researcher dressed in cosmopolitan city clothes quite different from rural dress. Often the farmer and researcher are from different cultural or ethnic groups, and may even speak different languages at home. All these differences are obvious to farmers, making them aware of being in a social situation they are unaccustomed to, and putting them on their guard about what they say or do.

The farmer may see the researcher or extension agent as someone who has access to knowledge, techniques, or inputs which can be valuable resources to the farmers. Many farmers know that elsewhere things are very different, perhaps better, and the

researcher or extension a[illegible]ay be seen as someone who can bring improvements from th[illegible]ide. While such expectation can provide a healthy motivati[illegible]r farmers to work with on-farm researchers, it may also c[illegible] a reserve, because the farmer does not want to offend the [illegible]or, who might in retribution cut off collaboration. For fear[illegible]hus offending the researcher, or just out of common courtesy[illegible]mers may be very cautious about expressing their true opinic[illegible] for example their concerns or doubts about the suitabili[illegible]f a new technology that the researcher is testing.

A different kind of res[illegible] -- one based on suspicion -- also exists. It can be partic[illegible]rly intense when the farmer and researcher come from differ[illegible] ethnic, religious, or social groups that have in the p[illegible] been in conflict. In this difficult, but not uncommon, [illegible]tuation, far from seeing the researcher as bringing goods f[illegible] the outside, the farmer may be suspicious of the researcher's[illegible]al motives, believing that the researcher has some hidden obj[illegible]ives which might actually harm the farmer directly. Meaningful[illegible]nd open dialogue about the pros and cons of the new technology [illegible]ll clearly be very difficult in such a situation, and the resea[illegible]er must behave so as to reduce these suspicions and nurture a [illegible]ositive, trusting relationship which encourages frank communicat[illegible]on.

Even where farmers are not [illegible]outrightly fearful or suspicious, they will very often have a strong tendency to defer to what they believe to be the views of the researcher. Because the researcher is a government official, better educated, and a representative of urban culture, the farmer may see the researcher as a social superior to whom deference is due, and subconsciously the researcher may share and even reinforce this deferential relationship. In such a context farmers may look for clues about what the researcher is thinking, and if the farmer

gets the impression that the researcher believes that some new technology is better than his own, the farmer will often defer to the researcher and express agreement, even when he does not really believe the new technology is better.

Because farmers can be so sensitive to what they think researchers want to hear, on-farm researchers must be careful not to impose their own opinions, thereby preempting farmers' expression of their ideas. Researchers who work on farm must be strongly motivated to succeed. They care deeply both personally and professionally about finding improved technology to help farmers. To be successful, on-farm researchers must have an optimistic streak. They must have the vision to see solutions, to see the possible, and not just see problems, difficulties, obstacles and failures. Yet, in order to obtain effective feedback from farmers about new technology being tested, researchers must be careful not to let their hopes and dreams influence what the farmer says.

When a farmer knows that a respected and esteemed researcher wants a new technology to succeed, the farmer may be reluctant to disappoint the researcher by pointing out a flaw in the technology. Consequently, the researcher must not fear the rejection or criticism of a technology being tested. The researcher must make it clear to the farmer that alternatives are being tested; that they may or may not be better than the farmer's current technology; that the researcher sincerely wants to know what the farmer thinks of the new technological possibilities. The researcher must recognize that the only sure way to be truly effective in helping the farmer and in winning their respect is by finding a new technology that truly meets the farmer's needs, not by having the farmer express approval of the new technology just out of politeness.

There exist a number of basic techniques that can be used to ensure that farmers are really encouraged to freely express their likes, doubts, and criticisms of new technologies. Taking care to use these techniques, an on-farm worker will be able to get effective and useful information from farmers on the performance of new technologies -- information undistorted by deference, socio-cultural differences, fear, or politeness. Achieving effective, informative farmer evaluations of trial technologies is not likely to occur spontaneously in a last-minute visit with the farmer at harvest. It requires careful nurturing of trust and honest communication throughout the entire process of on-farm trials.

IV. COMMUNICATION IN FARMER EVALUATIONS

A successful evaluation is one in which the farmer frankly expresses opinions about the technology the researcher and farmer are testing together, and is willing to discuss the reasoning behind those opinions. The essential ingredients of success are a high degree of trust and confidence between the researcher and farmer. This means that each party feels sure he understands the other's motives, what the other stands to gain from taking part in the evaluation, and what the other expects (and does not expect) from him.

Establishing such mutual understanding involves a social interaction between the researcher and the farmer in which many spoken and unspoken signals are exchanged, as in any face-to-face communication between people. The researcher's awareness of these signals, and of skills for consciously managing them, will determine the success of the evaluation. In this section, we review the techniques which researchers need to exercise in order to achieve successful communication with farmers.

ESTABLISHING A COLLEGIATE WORKING RELATIONSHIP WITH FARMERS

Entry, or managing first impressions

The term entry refers to the procedures used for gaining acceptance in the farming community of the initial presence of the on-farm research team, and for establishing an understanding among community members of what the researchers are about. Even when farmers are totally accustomed to the frequent presence of outsiders whose main activity is to ask them questions, the initial activities of the on-farm worker create first impressions which may be beneficial or prejudicial to the success of evaluations conducted with farmers later on.

When the on-farm researcher or team begins field work in a farm community, their actions will stimulate curiosity and speculation ranging from mild to intense. Farmers will ask themselves questions such as:

- "What do they really want to find out from us?"
- "How might they bring harm to or benefit us?"

It is important to be aware that first impressions and the way in which farmers discuss and answer such questions among themselves can influence the ease or difficulty with which relationships of trust and confidence are established. Therefore, presentation of the researchers' objectives from the starting point of entry needs to be carefully structured.

TABLE 4. Conventional expectations of farmer-researcher relations.

Definition of researcher's role	Definitions of farmer's role
Researcher is the expert	Farmer is the layman
Researcher is a social superior	Farmer is a social inferior
Researcher represents modern agriculture	Farmer represents backward, traditional agriculture
Researcher merits deference from farmers	Farmer should show deference to researcher
Researcher asks questions	Farmer gives answers
Researcher makes decisions	Farmer complies with researcher's decisions
Researcher controls strategic resources, may harm farmer, i.e. act counter to farmer's interests	Farmer lacks control, is powerless to influence researcher's behavior, is dependent on the researcher's goodwill
Researcher is supposed to teach and convince the farmer that new technology technology is better than existing practices	Farmer is supposed to learn from received wisdom of researcher

As discussed in the preceding section, the researcher is likely to encounter several possible expectations of his relationship among farmers involved in evaluating technology. The farmer may define the social situation in which he is being asked to take part in some or all of the ways illustrated in Table 4.

These expectations are possible sources of bias which are likely to discourage farmers from giving researchers frank opinions. They may also motivate farmers to distort the information they give during evaluations. Therefore, the researcher who aims to carry out farmer evaluations must have as his basic objective of managing entry the elimination of these expectations. He must recast them, and establish instead the expectations, summarized in Table 5.

TABLE 5. Key expectations for successful farmer evaluations.

- Researchers and farmers are experts in their own different fields of knowledge and experience.
- Both types of knowledge merit mutual respect.
- The farmer's agricultural practices, and whole way of life, are respected and esteemed by the researcher.
- The farmer needs to understand the technology that is being tested, and therefore has the right to ask questions; he is entitled to explanations and justification of the research.
- The researcher is motivated to learn from the farmer who will, therefore, teach as well as learn.
- The farmer will be responsible for decisions that can make or break the success of the research program, and is therefore controlling important activities. The researcher depends on the farmer's goodwill.

This brings us to an important principle for achieving successful farmer evaluations: it is essential not to think of farmers as passive informants in the evaluation. The farmer who is treated as a passive informant is not very likely to take an

active interest in evaluating a trial, or to make an effort to formulate opinions about the technology. He is very likely, though, to give answers that he guesses are what the person asking questions wants to hear. The success of an evaluation depends, therefore, on creating a social relationship in which the researcher and the farmer are both active participants in research, questioning, studying, and arriving at conclusions together. The first step in creating this type of understanding is at the point of entry, when it is critical to explain thoroughly the objectives of the evaluations, and to entertain questions and discussion about these objectives and what they imply in terms of farmer participation.

But a good social understanding between farmers and researchers is not enough to ensure effective evaluations of technology. Farmers must also understand what is being tested well before the evaluation is conducted. If farmers don't know or understand the research objectives, their evaluation will be superficial and misleading. To prevent this from happening, it is useful to arrive at the field site for the first time prepared to volunteer the following types of information:

- Your name.
- Your professional role (a simple job description).
- Your institutional affiliation (explain what the organization is called and what its main activities are).
- Reasons why researchers want to work on farms.
- Reasons why researchers need to talk with farmers.
- An explanation of what an experiment is, what is done, and for what purposes.
- An explanation of the role farmers will play in the research.

- Reasons why the farmer's role is important (how research will succeed or fail depending on whether farmers take part).
- An explanation of what farmers can hope to gain (and cannot expect to gain) from taking part.
- An explanation of what researchers cannot do (provide rural electrification, install schools, etc.).
- An explanation of your special interests and expertise (related to specific crops, disease, etc.), and of the types of information you are interested in.

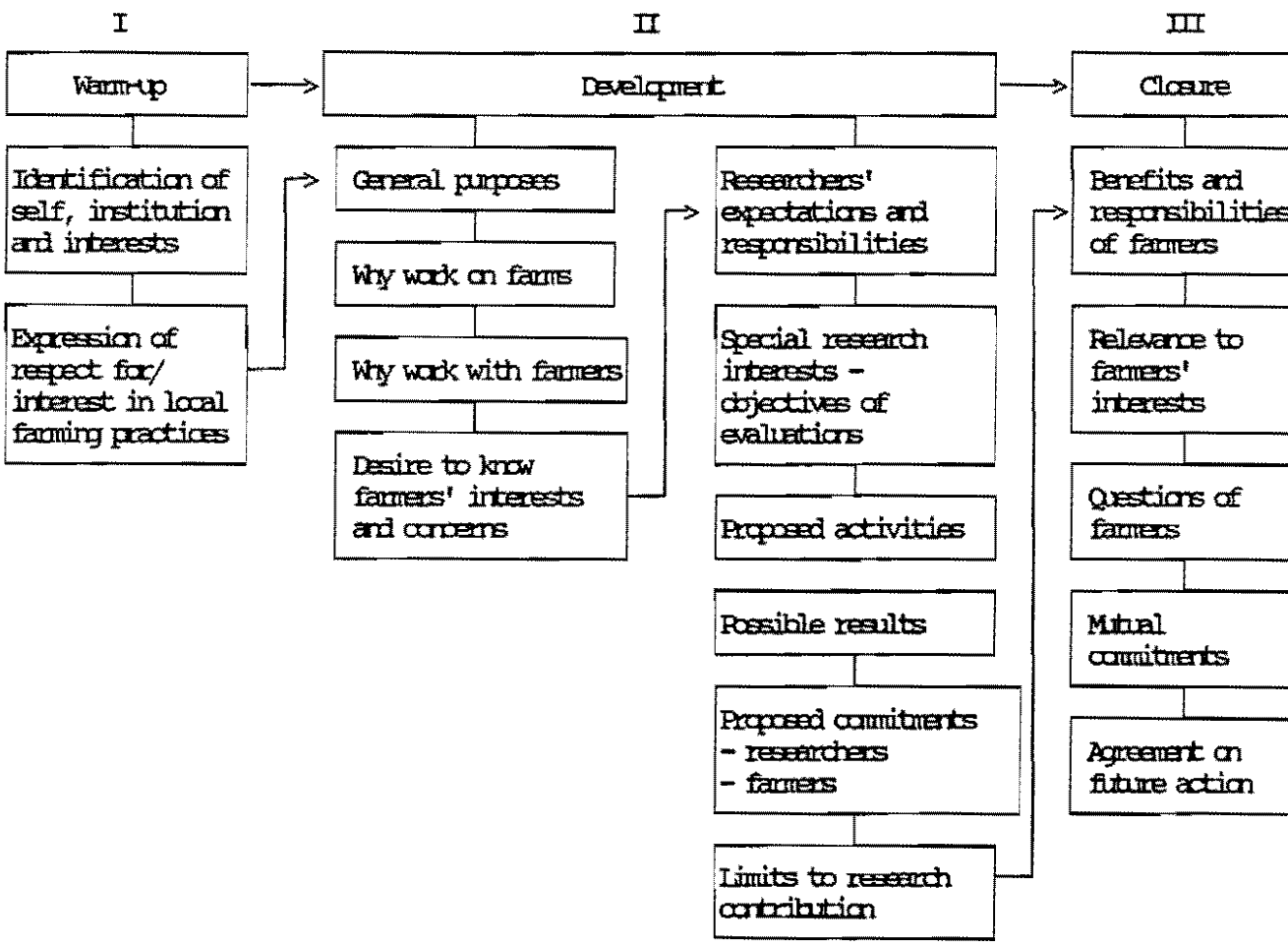


Figure 1. A flowchart of a dialogue with farmers for explaining the purpose of farmer evaluations.

Figure 1 summarizes these topics in the form of a flowchart. The development of a flowchart is a useful technique for planning and carrying out open-ended dialogue with farmers on any number of topics. Use of a flowchart helps to structure communication with farmers towards a particular objective without imposing the rigidity of a questionnaire. Researchers can refer to a flowchart during discussion with individuals or groups of farmers to check that essential topics have been covered, and that particular points of importance have not been forgotten.

In the example in Figure 1 where the researcher hopes the farmer will agree to take part in research, the dialogue is divided into three stages: warm-up, development, and closure. In the opening stage, the warm-up, the key expectations summarized earlier in Table 5 are being defined by the researcher's presentation of him or herself.

In the second or development stage of the interview, the researcher develops two general themes:

1) The general purpose of the contacts being made with farmers;
2) The expectations the researcher brings to the proposed relationship with the farmer, and the responsibilities involved on both sides, of taking part in the proposed evaluations.

Finally in the stage of closure, the researcher aims to verify that effective communication has been achieved about:

1) What the farmer can hope to gain from taking part in evaluations (inviting questions to clarify the farmers' perceptions);
2) Agreement on mutual commitments and future action.

Several techniques for managing this open-ended style of communication with farmers will be treated in detail in the later section on face-to-face communication skills. Others are basic principles of conduct which structure first impressions and will influence the effectiveness of farmer evaluations. These are briefly discussed below.

Treating the farmer as an expert.

A basic objective of farmer evaluations is to mobilize farmer expertise for technology assessment. While it goes without saying that not all farmers have the same level of competence in local farming practices, the researcher must treat each farmer as an expert. This is an important principle for laying the basis for a good working relationship with farmers. Therefore, it is extremely worthwhile for on-farm workers to communicate in initial contacts their intent to learn from the farmers.

A verbal explanation of why researchers want to learn from farmers is important, but not always convincing to a farmer who is accustomed to feeling deferential or suspicious towards official visitors. Therefore, the researcher should communicate non-verbally the value he places on a farmer's experience and wisdom, by asking farmers to teach and explain some local practice or practices which will be relevant to the proposed trial.

Such teaching can be done by individual farmers or by groups of farmers. It can focus on the use of traditional tools, planting methods, management practices (such as weeding), or harvesting methods, depending on the stage in the local crop season that contacts with farmers are being initiated. For example, professionals who have never practiced farming as small

farmers practice it might ask for instruction on the use of traditional tools. Upon receiving such instruction, they will probably be surprised at how difficult it can be to manipulate the local tools expertly. Yet showing incompetence in such a situation, where the farmer is the expert, is constructive rather than damaging to the working relationship needed for conducting farmer evaluations: it will reinforce the message made verbally by the researcher, that local farmers will bring unique expertise to bear on the technology evaluations. The researcher, by getting his hands dirty in such a situation, sends the non-verbal message that local farming practices are worthy of respect, a message which is especially important in cultures where low status is associated with manual work.

Treating the farmer as an expert also involves showing respect for the farmer's time, for local hospitality and social customs. Effective evaluations will not be achieved if the farmer is in a hurry to get on to some other pressing task while the on-farm worker is trying to explain a proposed trial or conduct an evaluation interview. Therefore, at any of the points of contact with farmers discussed in this handbook, it is essential to ask the farmer if he has time for the proposed activity. The appropriate response to any sign of hesitation on the part of the farmer is to request the farmer to suggest another more convenient time.

Equally, time spent in accepting hospitality and chatting on topics unrelated to evaluations is time well spent because it communicates non-verbally a respect for, and interest in, the farmer as a person, which is indispensable to a good working relationship.

Although these principles of field work are usually well-known and appreciated by experienced field staff, it is essential for researchers managing a large number of evaluations

to plan to allocate tasks with such considerations in mind, especially in the early stages of contact with farmers. The benefits of doing this are unquestionable. Placing the farmer in a teaching role is an extremely powerful technique for restructuring the conventional expectations of researcher-farmer relationships outlined in Table 4, and for subsequently working towards achieving those expectations essential for successful farmer evaluations. And it is especially useful for the design of evaluation interviews, because it provides the researcher with the local agricultural terminology, which is indispensable for understanding farmers' concepts. In addition, it communicates the on-farm worker's respect for, and intent to learn from, a farmer's knowledge. It also gives researchers the opportunity to assess how articulate different farmers are, as they explain how and why local practices are followed. This is an important criteria for selecting the farmers who will participate in evaluations.

V. COMMUNICATION SKILLS FOR CONDUCTING EVALUATIONS

Nothing seems more natural or straightforward than for an agricultural researcher or extension agent to talk with a farmer, especially because the topic of conversation is likely to be of profound interest to both. Yet because of the social dynamics of conducting farmer evaluations in developing countries discussed earlier, the skills required for effective communication with farmers are quite different from those which come naturally in everyday conversation. For this reason, an evaluation interview is very different from A conversation with farmers.

The open-ended evaluation interview is also a different mode of communication from the survey interview. The survey questionnaire might seek opinions which researchers should be able to predict. In contrast the open-ended evaluation interview explores what farmers think about the technology being tested. The answers are spontaneous, and not readily predictable. The information researchers will obtain from farmers by conducting evaluation interviews with them is not known until a number of interviews have been completed. This is precisely the purpose of the evaluation interview: to bring to light the farmers' criteria, which would otherwise be unknown. Some of the most valuable information from farmer evaluations can best be obtained through the proper use of open-ended questions, a technique quite different from the closed questions that are typical of the formal questionnaire. For these reasons, knowledge of how to manage the skills of face-to-face communication is invaluable for conducting the evaluation interview.

We can divide the face-to-face communication skills useful for farmer evaluations into two types of techniques: those for listening, and those for asking questions. How you listen to

what the farmer says is as important as what you ask the farmer. In a well-conducted evaluation, the researcher should listen more than he or she talks. This by no means implies that the researcher is passive. On the contrary, the person conducting an evaluation must constantly be alert to the need and opportunity to be directive, steering the flow of farmers' comments so that reasoning is clarified and information is gathered which makes sense to the researcher, and can be made intelligible to his or her scientific colleagues. The communication skills discussed here are unobtrusive methods for directing open-ended interviews with farmers so as to achieve effective evaluations.

How to listen in a farmer evaluation

If you could take ten or fifteen minutes to eavesdrop on a conversation between a researcher or extension agent (R) and a farmer (F) in the culture in which you plan to conduct farmer evaluations, you might see and hear any of the following:

- R agrees with F and interrupts him to give an example of something that supports his point of view.
- R vigorously shakes his head while F is speaking.
- R contradicts F.
- R shows disapproval by facial expression or by moving away from F.
- R is bored by F, stares into the distance, fiddles with his clothing, picks his fingernails.
- F shows R how to do something and R gives F advice on how to do it differently.
- R loses interest in what F is saying and introduces a new, unrelated topic of conversation.
- R expands on a theme to F and overrides F's attempts to speak.

In a discussion about agriculture between a researcher or extension agent and a farmer, these everyday conversational events are very likely to occur because researchers and extensionists have been trained to give farmers advice about how to improve on what they normally do. Yet each of these normal conversational behaviors is inadmissible, and counterproductive to a good evaluation. In contrast to a conversation, the farmer evaluation requires the researcher or extension agent to be receptive to whatever the farmer says, however contrary to received wisdom this may seem to be. It requires him to use listening skills to help the farmer articulate the reasoning that underlies the point of view that he or she is expressing.

Basic skills for listening to farmers will help the researcher to communicate verbally and non-verbally to the farmer that the researcher has a sympathetic and lively interest in the farmer's comments about the technology they are testing together. A useful exercise in this respect is to jot down on a piece of paper, for yourself, the culturally appropriate signals that you can make in a face-to-face conversation to express interest in what the speaker is saying. These might be for example:

- Nodding your head.
- Interpolating grunts that express interest ("uh-huh" and "umm" in English).
- Interpolating "I understand" or "very interesting."
- Leaning forward intently.
- Making eye contact.
- Smiling.
- Taking a relaxed body position.

The important "don'ts" in effective listening are therefore:

- Don't get impatient or interrupt the farmer.
- Don't contradict the farmer.

- Don't show disapproval of the farmer's statements, even if you disagree.
- Don't express judgements about the correctness or incorrectness of what the farmer says.
- Don't give the farmer advice during an evaluation, even if your other professional responsibilities or activities involve giving farmers advice.
- Don't convey either verbally or non-verbally that you are bored by what the farmer is saying, even if his comments wander away from topics that are of interest to you.

Body language

It should be clear from making a list of culturally appropriate signals used by an interested listener, that many involve body language. How you position yourself physically in an evaluation interview is an important technique for communicating respect, a serious intent to learn, and deference to the farmer's opinions. With practice, such techniques become second nature to the interviewer.

For example, it is quite usual for the researcher, because of his social and cultural origins, to physically tower over the farmer. This, however, implies a researcher's superiority. Opposite behavior is needed. For instance, when interviewing in a farmer's plot where a crop is being examined, it is useful for the researcher to stoop or kneel while the farmer remains standing, so that discussion can be carried on with the researcher looking up towards instead of down at the farmer. If the interview takes place in a setting where it is possible to sit, guide the farmer to a situation where both or all participants in the interview can talk sitting down. Often, in a household setting, farmers invite the researcher to sit while the

farmer remains standing. Again, it is important to communicate that it matters to the researcher that the farmer should feel comfortable in the interview situation by ensuring that both are sitting.

Very often in a field setting, researcher and farmer stand sweating in the hot sun throughout the interview; consideration for the farmer's comfort can be shown by moving the interview into the shade when practical. This communicates that the farmers' well-being is of concern to the researcher.

Another aspect of body language that can influence how the researcher communicates in an interview is physical space. Research shows that people position themselves physically in different relations to each other depending on the type of social interaction they are involved in, and common sense tells us this is so. Different degrees of physical proximity are acceptable among close friends, among acquaintances, or among business associates. Physical distance is a non-verbal way of communicating how much we trust someone, and the degree of equality between us. How closely we are placed in relation to another person affects our tone of voice, our ability to receive and interpret facial expressions, and many other qualitative aspects of human communication.

It is quite normal in interviews for farmers to position themselves at whatever is culturally defined by them as a formal distance from the researcher, implying deference on their part. Part of the process of establishing relations of mutual confidence in an evaluation interview involves communicating to the farmer that you, the researcher, wish to close this distance. For this purpose, there is a useful technique which is integral to the farmer evaluation: have the farmer show you something -- a tool, a disease-damaged leaf, an insect, a handful of soil, or

whatever is appropriate in the context of the ongoing discussion -- and close the physical distance between you in order to examine whatever is being shown. Alternatively, the researcher can take the initiative by picking up some item of interest and, while holding it, invite the farmer to come closer so that both can observe and comment on some aspect. This simple act redefines what is acceptable physical space between farmer and researcher, and qualitatively changes the communication that can occur.

Note-taking can be an important part of the researcher's repertoire of non-verbal behaviors that affirm serious interest in what the farmer is saying. Farmers' acceptance of note-taking varies culturally, and it can be perceived as threatening. However, if the techniques for setting up farmer evaluations discussed in this handbook have been followed, by the time the researcher carries out an evaluation interview with a farmer, note-taking should be seen by the farmer as evidence of the value the researcher places on the farmer's ideas and comments about the technology they are testing together. The physical act of note-taking by the researcher therefore becomes a signal to the farmer that what is being said is important. Energetic note-taking emphasizes unobtrusively to the farmer that this is a significant topic, and this can be used deliberately by the researcher to get the farmer to expand on a point or to direct the farmer's flow of ideas, while the researcher listens.

Body language can be quite different in different cultures. The important body language skills for face-to-face communication with farmers, involve identifying and practicing value-neutral body language which does not selectively support the interviewers' personal values, but encourages the farmer to speak freely.

From listening to questioning: probing

Probing is a technique which combines being a good listener with asking questions which direct the flow of a farmer's spontaneous comments. Probing enables the researcher to direct the flow of the farmer's comments unobtrusively by rephrasing or repeating in the form of a question something of particular interest that the farmer has said. This technique can be used in several different ways:

- Restate what the farmer has just said (the mirror technique): "So it resists the drought ...".
- Repeat a remark that has just been made in the form of a question. By doing this, you invite the farmer to expand on this particular theme: "It resists drought?"
- Go back to and repeat a comment made earlier. This can help to steer the farmer's flow of comments in a direction you think important.
- Ask the farmer to clarify "Could you tell me a bit more about this?"
- Summarize in your own words what you understand the farmer to have said, and ask, "Do I understand correctly?"
- Be prepared to admit uncertainty with the statement "I'm not sure I understand correctly; you seem to be saying the following..." and repeat the farmer's statement.
- Remain silent (the five-second pause), keeping eye contact. This encourages the speaker to keep talking.

The "key word" probe is a useful technique for checking your understanding of the farmer's point of view. This involves repeating a key word from what the farmer has just said and asking for clarification: "In what way is it resistant?" Probing is also important if you suspect the farmer is pulling your leg or lying for some reason. It also serves for checking the consistency of a farmer's remarks.

TABLE 6. Key word probes for checking interpretation of what farmers say.

FARMERS COMMENTS	KEY WORD PROBE
It's difficult to weed.	In what way is it difficult?
The sprawling plant is an advantage.	What makes it an advantage?
The flavor is better.	What is it about the flavor?
This is easier to grow.	How can you tell its easier?
This variety is too tall.	How does its being tall make a difference? What is "too tall" - what would be tall enough?

Open questions

There are two types of questions that the researcher could ask a farmer: leading questions and open questions. Leading questions are a normal feature of everyday conversation. They imply the kind of response that is expected: the speaker may be trying, consciously or unconsciously, to get the listener to agree with and support the speaker's point of view. While leading questions come naturally in ordinary conversation, they do not belong in farmer evaluations.

Asking open questions, however, is a key technique in farmer evaluations. They give the farmer free rein of expression without explicitly directing farmer's response. The researcher must, therefore, consciously repress and restrain his natural inclination to ask leading questions based on his personal opinions. He must instead monitor carefully how questions are posed, so that farmers express their own opinions.

Consider the following dialogue between a researcher and farmer who have entered a bean variety trial planted in the farmer's field:

Researcher:	This looks very nice, some of these varieties appear to be doing really well, don't you think?
Farmer:	Yes, well, these are all good varieties.
Researcher:	What about this one, doesn't this look as if its standing up well against the mildew?
Farmer:	Yes, this is a healthy variety, very resistant.
Researcher:	What about the others, don't you think they are less resistant?
Farmer:	Well, I think most have suffered from disease; they look pretty sick to me.
Researcher:	Yes, this one in particular has problems, don't you agree?
Farmer:	This plant is very bushy, it has a lot of disease.
Researcher:	Don't you think some of these varieties are rather late flowering?
Farmer:	Some, like this one here, have not formed any pods yet; this is definitely very late.
Researcher:	Isn't this one rather stunted, maybe this variety needs more fertilizer.... What do you think?
Farmer:	Well, we have a lot of problems here with fertilizer; it is very expensive.

This dialogue is loaded with leading questions posed by the researcher like those which begin with the phrase "Don't you think...," or which convey the researcher's own opinions and receive an answer that confirms these. The problem with this style of communication is that it is unlikely to produce valid information about the farmer's true opinions. The researcher in this dialogue has given the farmer no opportunity to take the initiative in identifying what he or she sees as significant criteria for evaluating the trial.

In a farmer evaluation, even a question like "Which of the treatments in the trial do you like best?" contains the

assumption that the farmer must like something in the trial. The appropriate open question is better phrased as "What do you think of the treatments in this trial?"

Open questions useful for farmer evaluations can be divided into two types which have different objectives:

- Questions asking for specific points of information from the respondent. Such questions are usually framed with words like: how; what; when; how many; how often; which.

- Questions intended to stimulate the respondent to express and explain ideas and opinions. Such questions use phrases like: do you think; do you see; why do you believe.

When farmer evaluation research is at an exploratory stage, use of open questions like those in Table 7 which invite the farmer to articulate opinions and explain them is especially important.

TABLE 7. Open questions to stimulate farmers' ideas.

Can you tell me more about this?
What would be an example of that?
What makes you see it this way?
What are some reasons for that?
Could you help me to understand this better?
Have you any other ideas about this?
How do you feel about that?
How do you think other farmers would feel about this?
How would you describe this? —

It is useful therefore, for interviewers carrying out farmer evaluations to develop a repertoire of questions such as the following:

- What do you think of the trial?
- Are there any treatments which you think are especially interesting? Why?
- Why do you think this difference (among treatments) has occurred?
- What do you think of the appearance of the plants?
- How do you think this treatment compares with that?
- Have you noticed any difference in the management (weeding/irrigation/fumigation, etc.) requirements?
- Why do you think this (referring to an observation made by the farmer) is important?
- What sort of yields do you think we are going to obtain?
- Do you think there are any problems here we should look into?
- Do you see any advantages or disadvantages to this (referring to an observation made by the farmer)?
- How do you think this compares with your current practice?
- What do you think of the time at which weeding (or any other operation) was done?
- If we plant this trial again next season, would you like to do anything differently? Would you like to suggest any changes?

In sum, the technique of dialogue with open questions relies on posing questions with words like:

- Why
- What
- How
- When
- Do you think

- Do you see
- Do you believe
- What is your opinion

Questions phrased in this way are open because:

- The researcher does not state his or her opinion in the question.
- The researcher does not imply that there is a "correct" answer to the question.

Establishing neutrality: balanced questions

One purpose of open questions is to show that the researcher is neutral about the preferences the farmer may have for any of the different treatments which the farmer is being asked to evaluate. It is extremely important to establish this neutrality at the outset of an evaluation so that, far from feeling that he should say what the researcher wants to hear, the farmer will feel confident that any positive or negative assessment is equally interesting to the researcher.

Often, at the beginning of a farmer evaluation, the farmer may be non-committal, aiming to be polite about the researchers' technology, and wondering about what he or she is expected to say. As a result, the open question "What do you think?" may at first elicit a polite response or vague generalities while the farmer stalls for time, hoping for leads which will indicate what opinions the researcher expects to hear. In this situation, the researcher can use the balanced question, which poses opposite points of view without indicating which one the researcher sympathizes with. For example:

Researcher: I've had several interesting discussions with local farmers about this planting system. Some say the plants are too far apart, others say they could be planted even closer. What do you think?

or:

Researcher: I've heard a number of interesting opinions from farmers around here about this variety. Some say they like a bushy plant; others say the bushy plant is a problem. I'd like to understand this better. What's your opinion?

Even though the questions in these examples are presenting the farmer with opinions, they can be useful starter questions in a farmer evaluation because they communicate to the farmer that (a) critical comments are valid and interesting to the researcher, and (b) there is no one "right" answer to the researcher's question.

Other examples of balanced questions which can be used are:

"Do you think this might require more or less labor/capital/fertilizer/irrigation etc. than what you presently use, or the same amount?"

"How would you market this, or would you use the products mainly for home consumption?"

"Would you recommend that we continue to test this, or had we better look for a different alternative?"

The disadvantage of the balanced question is that points for discussion in the evaluation are being introduced by the researcher. The farmer may not perceive planting distances or

plant architecture, posed in the first two examples, as important. Therefore, questions which pose alternative opinions are primarily used to warm up the discussion, by reassuring the farmer that his or her point of view, be it positive or negative, is being sought. Once the farmer is confident enough to take the initiative in an evaluation, listening skills and probing combined with open questions are the appropriate techniques to use.

Summary of communication skills for evaluation through dialogue

The face-to-face communication involved in an effective farmer evaluation is quite different from everyday conversation or just talking to farmers. In contrast to conversation or the formal questionnaire, the open-ended evaluation interview involves the researcher in an exchange of ideas which requires him:

- To communicate respect for and lively interest in farmers' ideas.
- To create an opportunity for farmers to express honest opinions.
- To elicit and understand the reasoning behind these opinions.

To achieve valid information about farmers' opinions, the person conducting a farmer evaluation needs to consciously use skills for managing communication which include:

- Listening skills
  - -- to communicate receptivity and respect.
  - -- to hear what the farmer is saying with an open mind.

. Body language	-- to communicate respect, trust, and a collegiate relationship, a partnership. -- to qualitatively improve communication by redefining physical space dictated by cultural norms when the researcher is a social superior to the farmer.
. Probing	-- to combine receptive listening with questions which unobtrusively direct the flow of a farmer's comments. -- to check understanding of the farmer's point of view, and consistency of the farmer's remarks.
. Open questions	-- to stimulate free expression of farmers' opinions. -- to avoid giving clues about the researcher's own opinions, which may bias farmers' responses.
. Balanced questions	-- to establish the researcher's neutrality with respect to positive or negative comments. -- to kick off and warm up the discussion, by reassuring the farmer that different points of view are sought, and that there is no "correct" answer.

VI. FARMER SELECTION

General considerations

Proper selection of the farmers that are to participate is critical to effective farmer evaluations of trials. As a rule of thumb, the number of farmers of a specific type who take part in evaluating a given technology should be not less than ten, while a group of 15-20 participants is desirable to provide sufficient observations for analysis.

Farmers who are invited to take part in on-farm trials are normally selected on the basis of interest, willingness to make available a suitable plot for a trial, and representativeness in terms of resources, age, sex, ethnic group, etc. In addition to such criteria, which are determined by the objectives of the testing program, there are other considerations which are especially important for obtaining effective evaluations.

One such consideration is farmer experience. If the test crop or crops included in the trials to be evaluated with farmers are commonly grown by farmers, special care should be taken to select those farmers who are known in their community as experienced in these crops, i.e. the local experts. The level of detailed observation that an experienced farmer will bring to bear on an evaluation is indispensable for obtaining high quality information about the acceptability of the technology being tested.

It is also valuable to identify those farmers who are known in their community as experimenters or innovators, whether the test crop is commonly grown or whether it is an innovation proposed for the local farming system. Local experimenters are apt to be creative thinkers in terms of perceiving potential opportunities within the constraints of their own system. Such farmers are accustomed to looking critically at alternative

farming practices. They are typically farmers who bring in new varieties, or who try out different methods on their own initiative, often without any formal contact with the research or extension system. Dialogue with such farmers in the early stages of an evaluation program, when, for example, the evaluation interview schedule is being developed, can be especially productive; it can provide insights into how farmers themselves perceive opportunities for changing local practices.

When selecting farmers, one must be careful not to confound a farmer's experience or his will to experiment with the fact that he has adopted advanced farming techniques because he has had sustained contact with extension and credit services. These farmer characteristics are not necessarily synonymous. Experienced and experimental farmers can and should be identified outside the elite of farmers -- usually an atypical minority -- who have adopted recommended techniques which the majority of farmers do not use.

Another consideration in selecting farmers is their ability to communicate with researchers. Some farmers are simply more able to express themselves than others. These more articulate individuals are not necessarily more intelligent or better farmers than their more taciturn neighbors, but are more able and willing to put their thoughts into words. By identifying first the farmers needed to ensure representativity, and then from that group selecting the subset that is most articulate, the researcher can improve his chances of getting informative farmer evaluations while maintaining representativity.

Methods for selecting farmers

Often farmers and sites are selected for an on-farm testing program just before a planting season begins. As a result, farmer selection can become a race against time to identify the required number of participants and fields. Simply the

willingness of a farmer to make available a desirable plot for the establishment of a trial can become the most important criterion for determining which farmers participate.

Farmer selection for the purpose of carrying out evaluations can be planned in advance by the development of lists of potential participants who satisfy the criteria of local expertise, interest in local experimentation, and ability to communicate. Such lists can be drawn up during diagnostic research (entry) by including questions like the ones outlined in Table 6 in informal or formal survey interviews, and tabulating the names which result.

Table 8. Questions useful to field workers for selecting farmers to participate in evaluations.

Farmer experience	. How long has the farmer cultivated the test crop?
	. Does the farmer routinely grow the test crop (eg. each season, or sporadically)?
	. Does the farmer routinely implement typical local cultural practices (non-experimental variables in proposed trials)?
	. Who are recognized by other farmers as experts in the test crop (cultural practice) of interest to the research?
Farmer experimentation	. Has the farmer tried out any different ways of cultivating the test crop? What and why?
	. Is the farmer testing new ideas on his/her own initiative? (Or following an extension agent's recommendation).
	. Who are farmers recognized locally as "experimenters" by their peers? Who are recognized sources of local innovation?
Ability to communicate expertise	. Can the farmer explain (teach) a local practice?
	. Can the farmer clearly explain the difference (advantages and disadvantages) between two (or more) alternative local practices?

Another approach is to identify one or two key informants for each community or agroecological area where farmer evaluations are to be carried out. Each key informant is asked

to name farmers from within a specified area with which they are familiar, who they consider to be local experts. The interviewer needs to ask the key informant to explain first, the boundaries of the area or community which is his frame of reference, such as a village or district.

If a complete list of local inhabitants or households in a community can be obtained, their names can be written on cards and sorted by literate key informants to identify local experts. Key informants can then also be asked to identify local experimenters. These lists can usually be drawn up in an hour or two depending on the size of the community the informant is asked to consider.

Farmers recognized as local experimenters may or may not co-incide with the individuals identified as local experts, and it can be important to the farmer selection process to understand this difference. For example, three groups of farmers might be identified by key informants:

. Local experts (practicing traditional technology).
. Local experts experimenting with new practices.
. Local experimenters (using non-traditional technology).

A sample can be drawn from the lists of names, or groups of individuals identified in this way, and these individuals can be included in the preliminary visits or interviews in the research area, to obtain an idea of their ability to communicate with researchers.

A useful technique for assessing farmers' ability to communicate with researchers is to carry out teaching by farmers during preliminary visits to explain research objectives to local farmers. Farmers who are more able or willing to put their thoughts into words can often be easily identified in this way. Next, it is essential for the researcher to explain what kind of

farmer he or she is interested in identifying, by covering the questions on farmer experience outlined in Table 6 for example, with the key informant. Once the researcher and key informant have clearly defined a common set of terms for defining experienced farmers, then lists of names can be drawn up together.

Farmers' ability to communicate can also be assessed by asking a farmer or group of farmers to take part in a simple pairwise comparison of three or four items of local technology (such as four local varieties, or different methods of land preparation, for example). Pairwise comparison is discussed in detail in the later section on techniques for eliciting farmers' preferences. This technique can provide useful information on local practices of interest for the planning of on-farm trials, and at the same time it can help researchers to identify those farmers who are likely to express themselves readily in an evaluation.

Grouping participants for evaluations.

Farmer selection can be further refined to take into account other farmer characteristics which may be relevant to the proposed evaluations. This can be done by asking key informants to group experts they have identified according to a given characteristic. Table 7 gives a checklist of characteristics which might be considered. This can be done by reviewing the list of local experts and asking the key informant to decide which category an individual falls into; or by sorting cards, each with an individual name on it. For example, local experts might be grouped into those with livestock (an indicator of wealth) and those without; or into those who work as wage laborers (an indicator of relative poverty), and those who do not. A sample can be drawn from each set of names grouped in this way, to ensure that participants in future evaluations are

representative of characteristics which may affect how farmers evaluate a technology.

TABLE 9. A check-list of farmer characteristics for selecting participants in farmer evaluations with key informants.

- Expertise (experience) in local technology.
- Experimentation with new ideas.
- Socio-economic resources:
  eg. farm size or wealth
  ownership of livestock
  land tenure
  employment in wage labor
  family size
  Kinship
  Political leadership
- Farmer objectives:
  eg. commercial vs. subsistence-oriented
  specializing in crops vs. livestock
  specializing in crop vs crop
- Ethnic or linguistic group.
- Gender
- Location:
  eg. distance from market
  agro-ecological zone (highland, lowland, etc.)

The success of this technique depends on identifying clear-cut categories which the key informant can easily apply. For example, if the key informant is to be asked to group local experts he has named into large farmers, medium-sized and small farmers, it is important to establish what criteria the informant believes distinguishes large from medium farmers, and medium from small farmers. In regions where farm area or size are not readily quantified by local farmers, ownership of a certain type of land, of a certain number of cattle or the custom of hiring laborers paid in cash may distinguish the large or wealthy farmer. The key informant can be asked to sort experts according

to one such commonly-held criterion, to distinguish large farmers from the rest. For example, farmers who operate a sugar-cane mill on their farm might be considered the most well-to-do. Then sorting of the remainder can take place on the basis of another criterion that the key informant identifies, to separate small from medium-sized farmers. In the same example, local farmers who are too poor to plant sugar cane could be readily named by a key informant, as the least well-off members of the community.

Another approach to grouping farmers for selection purposes which can readily be carried out with key informants is to list farmers in the community according to types or categories which are distinguished locally and therefore, well-known to the key informant. Such types or categories can be thought of as "interest-groups" which can usually be identified in the following way:

- first, by asking a key informant "what different kinds of farmers are there in this community (area)?" In this way, the different local categories of farmers are obtained;

- next the key informant is asked to name farmers within each category;

- finally, the key informant can be asked to designate those who are considered local experts and/or experimenters within each category.

In one example, farmers could be distinguished by local people into those who are primarily engaged in livestock production; those who specialize in commercialization of a major crop cassava; and those who carry out mixed cultivation, primarily for subsistence purposes, and who also work as agricultural laborers. Each category had local experts in its way of farming.

"Interest groups" or types of farmers defined in this way by local informants are particularly useful for selecting participants in farmer evaluations when the technology to be evaluated needs to be targeted at a particular group. The more homogeneous the participants in farmer evaluations, the more consistent and reliable the information obtained from evaluation interviews is likely to be.

Alternatively a research program may want to obtain evaluations of a proposed innovation from a cross-section of different types of farmers or interest groups. Selecting participants for evaluations on the basis of groups defined in terms of a common identity which is perceived by local farmers, helps researchers to interpret differences in the criteria farmers use to evaluate the technology. This occurs because farmers' evaluation criteria for deciding what technology is useful will vary according to the perceived interest the farmer has in mind when he or she assesses it.

Careful farmer selection is critical to the successful implementation of an evaluation program. This is especially the case if evaluations are being conducted in an early exploratory stage of technology testing, when the number of on-farm trials and farmer participants may be relatively small, and the weight given to any one farmer's opinions in the results of evaluations will be considerable. Therefore, researchers should take sufficient time before setting up trials to properly select participants for the proposed evaluations.

VII. SETTING UP FARMER EVALUATIONS

Obtaining reliable data on farmers' reactions to the technology they are helping to test involves creating and nurturing relationships of mutual understanding and trust between researchers and farmers when they meet in the on-farm trial and in evaluation interviews. Effective farmer evaluations are not launched therefore at the time when trials are ready to be harvested. Well before the evaluation of a trial is to be carried out, the farmer must understand what is being tested, and what questions are being addressed by the trial. Without intimate knowledge of the purpose of the trial and how it is designed to test the performance of the technology, the farmer will be unable to make well-founded judgements; as a result, the evaluation is likely to elicit superficial and even misleading opinions.

Evaluation as a process

By the time the on-farm worker arrives at a farmer's home or field to carry out an evaluation interview, the farmer will have participated in some or possibly all of the following activities together with research or extension staff:

- Explanation of general objectives of evaluations (entry).
- Teaching by farmers.
- Planning of trials.
- Explanation of trial design.
- Selection of trial site.
- Allocation of treatments within trial site; mapping of trial.
- Development of evaluation interview.

Completing the evaluation process involves conducting one or more interviews, depending on the stages of crop development that researchers want farmers to evaluate. Once interviews have been

analyzed, it is desirable that farmers be informed of the general conclusions they have reached by participating in evaluations. This can provide an opportunity for planning future activities with them.

In fact, evaluations with farmers should be integrated with other activities typically required for mounting a program of on-farm trials, so that field staff are used efficiently. The total number of contacts between research staff and farmers required for farmer evaluations is not necessarily much greater than those required for research staff to monitor conventional farmer-managed trials where farmers' opinions are not systematically sought. However, contact with farmers cannot be skipped over on visits to on-farm trials. Such visits must routinely program opportunity and time for discussion with farmers.

Evaluation interviews while the crop is standing in the field and agronomic assessment of the trial should not be carried out by the same person at the same time, because the evaluation interview is centered on the farmers' opinions while the agronomic assessment is based on the researchers' criteria. If both activities are conducted simultaneously, the farmer's evaluation is likely to be confounded with the researcher's evaluation. If two people cannot carry out the evaluation interview and the agronomic assessment independently on the same visit, it is better to carry out the interview first, and then complete the agronomic observation.

In sum, and as outlined in Table 8, the activities discussed in this handbook should become part and parcel of on-farm research, with the difference that systematic consultation with farmers is a continuing feature.

TABLE 10. Integrating farmer evaluations into on-farm testing.

Stage of research	Evaluation activity
I. Diagnosis:	-- Explanation of objectives of evaluations (entry)
Site reconnaissance and survey interviewing	-- Teaching by farmers
II. Planning experiments	-- Planning trials with farmers
III. Experimentation: Farmer/site selection for trials	-- Selection of farmer participants; explanation of trial design; site selection with farmers
Trial establishment	-- Allocation of treatments; mapping of trial with farmers
Agronomic assessment of standing crop	-- Evaluation interview of standing crop
Harvest with farmer	-- Evaluation interview after harvest
IV. Analysis and evaluation of trial results	-- Analysis of evaluation interviews
V. Formulation of recommendations	-- Feedback to farmers on results; planning future evaluations with farmers

The next step: Informing the farmer

Once farmers have been selected to participate in evaluations of on-farm trials, there are a number of approaches which the researcher can use to ensure that the farmer has a sound understanding of what the trial is about, so that he is in a position to make judgements about the technology being tested. These approaches include:

- Planning farm trials with farmer participation.
- Active management of trials by farmers.
- Orienting farmers to trial layout and objectives.

First of all, it is desirable to involve farmers early in the planning stage of on-farm research, so that they have some influence on decisions about what technological components are to be included, and how these will be tested. Participatory planning of trials ensures that farmers are not asked to evaluate a technology in a test situation which they may perceive as irrelevant or inappropriate to the actual use of the technology.

When farmers have not participated in the planning stage, their understanding of a trial can be improved if they are actively involved in the management stage. In this case, one of the objectives of the trial is usually to evaluate the performance of the technology when farmers carry out the management operations. Farmers can supply valid evaluations only if they participate in real decisions about if, when, and how to carry out these operations, and not if they are just physically present, in the role of field workers following a work plan determined by the researchers.

When trial objectives involve researchers rather than farmers in managing the trial, farmer evaluations can be conducted if the researchers take time to carefully explain to farmers the objectives and layout of the trial. This must be done in terms that a farmer can easily understand. When complex trial designs are used, it is usually necessary to select a subset of treatments that are most likely to stimulate insights from the farmers doing the evaluating.

With any of these approaches, some basic steps can be taken to ensure that the farmer has a sound understanding of a trial and that effective communication can be achieved.

Explanation of the trial

In this manual we are concerned with research trials, not demonstrations. The goal of farmer evaluations is not to convince or persuade the farmer of the merits of any given treatment. On-farm workers need to be aware that many farmers, whether or not they have had prior contact with demonstration plots of the extension service, will have the latent expectation that the researcher hopes to persuade or convince the farmer in some way that the researcher's technology is best. It is not uncommon for a farmer to perceive a trial as a competition between the farmer's usual practices (the farmer's check treatment) and the researcher's new practices, which can lead farmers to manage the check differently in order to demonstrate the best results they can obtain if put to the test. This is clearly counterproductive to obtaining valid results.

Active farmer participation in evaluation depends on the farmer's desire to observe and question. Therefore, the explanation of a research trial which a farmer is being asked to evaluate must leave no doubt in the farmer's mind that the results of the trial are not a foregone conclusion. It is essential to communicate to farmers that the trial is a form of enquiry, that both farmer and researcher will be asking questions together about the performance of new technology, and that the answers to those questions are unknown. Communicating the value of active questioning on the part of the farmer requires the on-farm worker to explain carefully the question that the trial is addressing in terms the farmer can understand.

Many farmers test new agricultural practices on their own by setting up comparisons between old practices and new ones. A simple explanation of a trial can be developed by researchers in the form of a step-by-step account of the comparisons that are to be set up in the farmer's field, and the questions these address. A verbal explanation tends to be abstract, so comparisons can be

illustrated concretely and graphically on the floor or table with samples of different elements to be included in the trial. For example, if quantities of seed or fertilizer are going to be tested, bags of seed or fertilizer can be used to symbolize the different treatments. This visual, hands-on approach gives farmers the opportunity to handle samples and to understand differences in treatment levels by seeing the contrasting quantities involved.

Explaining a trial to a farmer prior to planting is thus an opportunity to establish the researcher's neutrality and objectivity with respect to the comparisons set up by the trial; communicating that objectivity to the farmer is indispensable. One way to accomplish this is to introduce comparisons between treatments in the trial by using balanced questions. For example:

> "We want to find out if it's more profitable for you to apply this much fertilizer or that much."
>
> "Will it require more work for you to plant in this way rather than in that way?"
>
> "Will these varieties be more resistant to disease, or will they yield more than those? We don't know yet...."

It is also worthwhile for researchers to explain that the trial they are about to plant with a given farmer will be replicated with several other farmers, as is usually the case in on-farm research, and that the results will be pooled to give a picture of what is useful for their community. The objective here is to communicate that the farmer's contribution to this activity represents a service to the farm community, and not just a favor to the researcher.

Towards the end of explaining a trial, it is important for the researcher to check how well the farmer has grasped its objectives, without worrying about whether a detailed understanding of different treatments has been achieved. An open question can be used such as: "What do you think you may find out from this experiment?" backed up with probing questions, so that the farmer expresses his opinions and any misconceptions he may have. In this way, the researcher can make sure that the farmer has no false expectations, that he sees the trial not just as some mysterious game played by researchers, but as a useful exercise which generates useful information for the farmer, regardless of whether a successful new technology is identified.

Finally, it is important to discuss with the farmer what might be appropriate times to visit the trial, possibly with a view to carrying out an evaluation interview at a critical stage in the trial's development.

In summary, the explanation of the trial should:

- Communicate that the farmer is taking part in an investigation to find out what occurs, not a demonstration to persuade or convince.
- Establish the researchers' neutrality with respect to the end results, by using balanced questions.
- Communicate specific ways in which information generated by the trial may benefit the farmer and the community.
- Use simple visual methods of communicating comparisons between examples of elements to be included in the trial.
- Check the farmer's understanding and eliminate any misconceptions or false expectations.
- Clarify the mutual responsibility and actions required of farmers and researchers in carrying out the trial, including future visits.

These points can usefully be planned ahead of time in the form of a flow-chart to which the researcher can refer during the explanation of a proposed trial with a farmer, to ensure that the relevant points are covered.

Selection of the trial site

Whether the farmer is given the opportunity to designate the trial site, or whether the researcher determines this, it is essential that the researcher explain what the desirable features of the site are with respect to the trial objectives. On-farm researchers often have the experience that farmers agree to provide land for trials and then provide sub-optimal locations, atypical of those in which the test crop is usually planted by local farmers. This is a sure sign that farmers have no grasp of the trial's purpose and feel that they have no vested interested in the trial's results. For a farmer evaluation of any type of trial to be effective, the researcher must communicate to the farmer how the hoped-for results will provide information that the farmer might benefit from, and how these benefits will depend on selecting an appropriate site.

Much on-farm testing in which farmer evaluations are planned will benefit from the selection of a site within a field where the farmer actually plans to plant the test crop on his own account. The evaluation process should include discussion with the farmer of why he thinks a certain field is suitable for the type of trial that is being proposed.

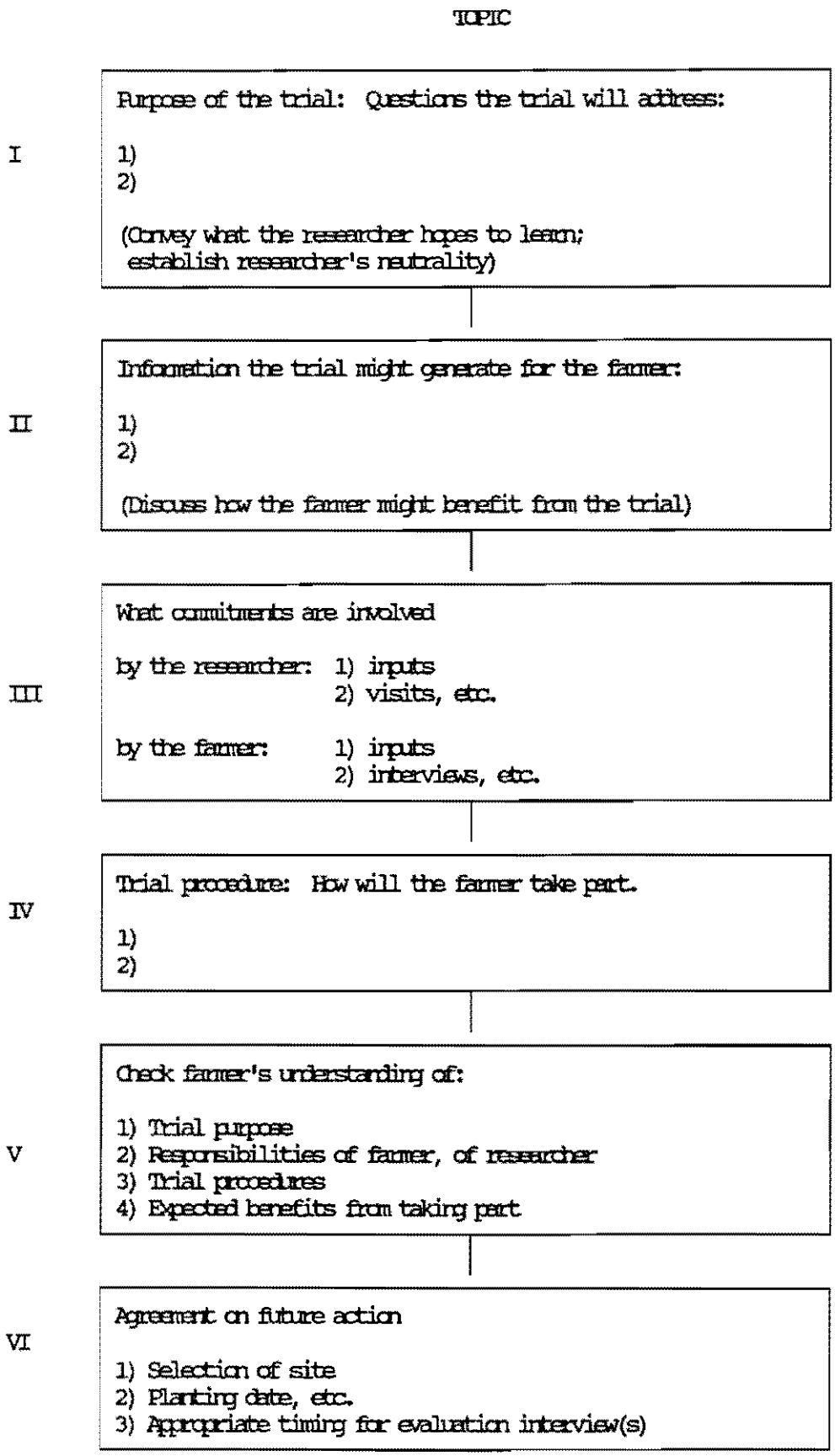


Figure 2. Flowchart of an explanation of a proposed trial for evaluation by farmers.

Assigning treatments to different locations in the trial with the farmer

Once the site for the trial has been chosen, the researcher and the farmer can stake out the individual parcels together. Involving the farmer in the procedure for assigning treatments to parcels is important because it orients the farmer to the location of each treatment from the outset. This is essential because the farmer must be able to evaluate differences among treatments independently of the researchers, as he or she observes the trial's progress. The farmer can take part in the random assignment of treatments by using slips of paper numbered for each treatment and throwing them into a hat or other container. For illiterate farmers, pictorial symbols or different objects can be used instead of numbers to represent each treatment.

An explanation of random assignment given to a farmer might go like this:

Researcher: Now you can see the area in your field where we are going to plant the experiment, and in each of these small parcels marked out here with string we are going to plant a different variety (fertilizer/combination of inputs etc.). Do you think the soil in this area for the experiment is all the same?
... We can't be sure, and so as not to give one variety a better place than another on purpose, we are going to have a raffle....
You see the bags of seed and fertilizer lined up here. Each one has a different number (symbol). Now, each of these numbers is written on one of these slips of paper. We'll start here in this

> small parcel, you draw a number from the hat and whichever one you draw will be the number of the bag of seed we plant here.
> ... You drew the number 9. This bag of seed and this bag of fertilizer are also number 9.
> So we will plant them here in this parcel. Now lets move on the next parcel and you draw another number.
> ... Let's keep doing this until each of the bags has been placed in a parcel, where it will be planted. In this way, each variety and fertilizer has the same chance of being on a patch of good soil or poor soil and we won't be deliberately giving one a better chance over another....

The layout of a trial can be mapped with literate farmers by drawing a map showing the landmarks and location of treatments in the trial. A copy of this map can be left with the farmer.

In any case, markers (such as labelled stakes) should be placed at appropriate sites in the trial to enable the farmer to locate the different treatments.

A useful test of how observant the farmer has been is if, during a visit with the researcher to the field where the crop is standing, the farmer can guide the researcher around the trial. If the farmer can point out where treatments are located without being oriented by the researcher, the farmer has been observant and an effective evaluation can be obtained. The less able the farmer is to find his or her own way around the trial, the less reliable the results of the evaluation are likely to be.

VIII. THE EVALUATION INTERVIEW

The evaluation interview discussed in this section might be carried out to assess with farmers the potential of any number of different kinds of technology. The broad context is one in which the farmer evaluates an on-farm trial or on-station test of the technology, and interviews might be carried out while the crop is standing in the field, or after harvest. Alternatively, the farmer may be interviewed about a practice or use of a piece of machinery which for example, is applied at land preparation, planting or weeding time. Whatever the specific situation, by the time the evaluation interview is carried out, the farmer should have some degree of "hands-on" familiarity with the proposed innovation and an understanding of researchers' objectives in seeking information about farmers' opinions.

Planning evaluation interviews

Clarify expectations. It is essential to plan the evaluation interview in such a way that a clear mutual understanding about obligations and expectations is established. Information about farmers' preferences is particularly subject to bias or distortion introduced by the many social inhibitions to honest communication discussed earlier. The farmer may be afraid to criticize or reject alternatives in front of researchers just because he or she fears that as a result, the researchers will discontinue further trials on the farm. Even if the farmer obtains few material benefits from taking part in an on-farm trial, he may fear the loss of status in the eyes of his peers if the researchers stop collaboration. It is, therefore, especially important to clarify expectations with farmers before soliciting and recording their opinions in the interview. Farmers need to understand how the information about their opinions will be used, and how it might affect future collaborative research with them.

An essential first step in developing the evaluation interview format is to outline:

. How the purpose of the evaluation will be recapitulated with the farmer.

. A simple explanation of how the information will be used.

. What future activities with local farmers are likely to develop (if any).

What does the farmer need to know?

A second step in planning evaluation interviews is to consider what the farmer needs to know about the technology in order to carry out the evaluation. This will help to determine the number of interviews to carry out with a given farmer, or group of farmers, and the timing of the interview(s) with respect to different stages in the trial or test of the technology. If changes in managing practices are an important feature of the new technology, it may be important to carry out an evaluation interview at the time when the farmer is most likely to observe their effects on his labor requirements, for example. If storage and eating quality of new varieties are likely to influence farmers' opinions of their acceptability, then interviews must be timed to allow this evaluation to take place. In an evaluation at harvest time, the researcher must consider whether information on price differentials of inputs or output will be of importance, and should aim to cover this information in the evaluation interview in terms that farmers can readily understand.

The use of local agricultural concepts, measurements and vocabulary is essential. For example, researchers should be

prepared to measure and discuss yield in units commonly used by farmers: if farmers evaluate yield in terms of return to seed (amount harvested per unit of seed) then the evaluation interview needs to incorporate this concept. Similarly, fertilizer requirements may be interpreted in relation to the amount of seed planted, rather than percent of land. In any case, technical jargon inhibits communication with farmers, and the researcher needs to compile a glossary of local agricultural vocabulary and then use it when carrying out farmer evaluations.

An important reason for conducting farmer evaluations is to discover whether or not farmers' criteria differ in important ways from those of the researchers. Therefore, farmers must be able to put forward concepts unanticipated by the researcher, and to develop explanations of these. Such concepts and their analysis form the most important contribution that a farmer evaluation can provide to a crop improvement research program.

In order to record unanticipated, spontaneous reactions by farmers to the new technology -- and thereby conduct effective farmer evaluations -- researchers need a flexible interview format. This can be developed rapidly around a sequence of techniques:

- the initial use of open evaluation to capture spontaneous comments;
- the development of a list or glossary of farmers' criteria based on the results of the open evaluation;
- the application of techniques to elicit preferences.
- the use of directive questions to explore issues of specific interest to researchers.

Open evaluation

Open evaluation is a first step towards developing a more structured evaluation interview format. Thus, a few open evaluations are carried out first, to allow researchers to "test the waters" or form an initial assessment of the criteria farmers are likely to use when they evaluate the technology. Subsequent interviews build on the results of the initial open evaluations to incorporate the farmers' criteria thus identified. However, open evaluation is a technique which can also be used to warm up a structured interview which follows. A useful rule of thumb is the following: the greater the dependence on recall by the farmer, the more important it is to use open evaluation and the open question techniques discussed earlier, to stimulate the farmer to formulate and articulate ideas and explanations about his or her evaluation.

The open evaluation records farmers responses to the question "What do you think of this treatment ie. planting distance, crop association, variety, etc..." The objective of the open evaluation is to capture the spontaneous comments of the farmer, and to analyze these as indicators of what the farmer sees as the most important features of the technology. Usually the farmer who has been attentive to and observant of a trial will single out two or three treatments in a trial which is testing several alternatives, while commenting hardly or not at all or the remaining treatments. All this information is important, and the value of the open evaluation is to allow this kind of questioning and discrimination to happen, and to be recorded by the researchers.

Before starting evaluations with farmers, the researcher should make a list, based on prior knowledge, of what he or she expects will be important to farmers. Such a list might include for example:

INTERVIEWER TECHNIQUES FOR STIMULATING FARMERS' IDEAS IN OPEN EVALUATIONS

1. Ask "What do you think of ..." (this trial, this treatment, this planting system, this variety, etc).

   . Then probe with:

   "Could you explain that?"
   "Tell me more about it?"
   "Can you give me an example?"
   "Is that an advantage or a disadvantage for you?"

2. Ask about meaning

   Farmer: "This variety makes weeding more difficult".
   Interviewer: "What does 'more difficult' mean to you?"

3. Ask about values and feelings

   Farmer: "This way of planting will take more time".
   Interviewer: "How do you feel about that?"

4. Ask about similarities and differences

   Interviewer: "Would you group any of these? How do they go together? Why do you put these in one group and those in another?"

5. Ask what difference does it make?

   Farmer: "I like this plant because its very bushy and has a lot of leaves".
   Interviewer: "Does that make a difference to you? Why is it important to you? Would it ever not be important? When? Why?

6. Query contradictions

   Interviewer: "You said that plant is bushy and that's an advantage - but here you say, this plant is too high because its so bushy: Can you explain this to me?"

7. Use the "naive" approach

   Interviewer: "I've never worked as a farmer here: Why might I want to plant this way? Why not? What would you tell me if you were teaching me about this technology?"

8. Design or redesign

   Interviewer: "Imagine you could make (or design) your own perfect (plant/fertilizer/plough, etc)? Don't worry about whether its possible or not ... just use your imagination and tell me, what would it be like?"

   or

   Interviewer: "If you could change this in a any way you liked, what would you change? What would you leave the same?"

. Labor at planting
. Weed management
. Date of harvest
. Marketability of new variety

And interviewers should be familiar with this information. The purpose of making this list is that it helps the interviewer to discriminate, to listen for, and to record the anticipated and unanticipated comments. The expected criteria can be entered onto the open evaluation sheet and used later for coding as illustrated in the example of an interview form for open evaluation, in Table 11.

Although the researcher may want to ask the farmer specific questions about certain aspects of the technology, this is best done only after the farmer has had an opportunity to comment freely on anything that he or she perceives as noteworthy, without being influenced by any of the researcher's concepts or ideas.

If the field staff are available, it is useful to have two interviewers present at the initial open evaluations so that one can concentrate on phrasing open questions, probing for explanations, and interacting with the farmer, while the other interviewer concentrates on recording the farmers' comments. A small, unobtrusive tape recorder is a useful alternative to the second interviewer.

It is worthwhile to conduct the initial two or three open evaluations, which will be used to design future interviews, with farmers who are the most articulate of those taking part in the evaluations, and who are the least reserved about expressing honest opinions and questioning the field staff about the trial.

Table 11. Interview form for open evaluation.

CASSAVA VARIETIES
OPEN EVALUATION

VARIETY ID _____ FARMER _____

CODE FOR COMMENTS:

Criteria	Positive aspects	Negative aspects
(a) Yield		
(b) Plant height		
(c) Height of branching		
(d) Resistance (disease/pests)		
(e) Period(s) for harvest		
(f) Root appearance		
(g) Root rot		
(h) Starch content		
(i)		
(j)		
(k)		
(l)		
(m)		
(n)		

It is extremely important in an open evaluation to record the farmer's comments as exactly as possible, in his own words. The interviewers' interpretation or explanatory notes can be written in parentheses. Comments and explanatory notes can be recorded as shown in Table 12, which gives an example of notes taken in an open evaluation of a cassava varietal trial carried out with small farmers in Colombia, South America.

At the bottom of the interview in Table 12 are shown criteria originally listed by the researchers'. Blank spaces are for adding criteria obtained from the farmer, when the interview is coded. Thus, the farmer in the example in Table 12, mentioned starch content (e.g. commented that it was good); plant height (a short plant was viewed positively) and height of branching (low, viewed negatively). These criteria were anticipated by the researchers in their list. However, this farmer also observed that the creamy color of the skin and flesh of the cassava root were likely to get a lower market price; and that the positioning of the roots in relation to the stem would cause the broken root to deteriorate quickly after harvest compared to varieties with a different root-stem relation. Both features were perceived negatively by the farmer. These criteria were not anticipated by researchers and were added to the list during coding of the interview.

After the initial two or three evaluations have been completed and coded in this way, the result is a list of criteria which are likely to occur commonly. The list can be added to interview sheets and used to code further open evaluations, while unanticipated criteria can still be added to remaining blank spaces.

Table 12. Interview form for open evaluation.

CASSAVA VARIETIES
OPEN EVALUATION

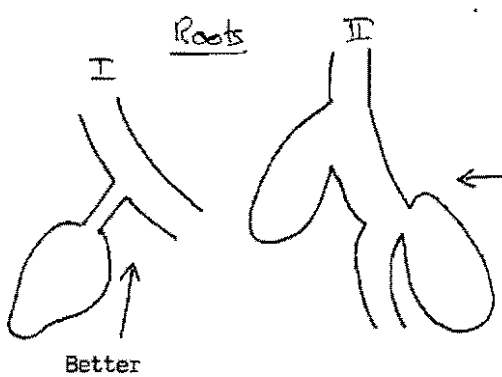
VARIETY ID G-1786 FARMER LUIS BETANCOURT

FARMER'S COMMENTS[1]

Has high starch, not "watery", "dry", is "floury". The "skin" is white (epidermis is pink), and flesh "creamy", a disadvantage because pink skin is getting a better market price, the starch processing factories will take this but the middlemen will not.

This plant is "medium" in height (measure about to waist high)
(- see agronomic evaluation)

"I like this because very tall plants are difficult to harvest. But the disadvantage is that it branches very low (ie. close to the ground). This makes weeding difficult". "On the other hand, smaller (shorter) plants are usually higher yielding". But this will have to planted further apart to make weeding easier, so the production (production per unit of land?) will be lower". "This has a good number of roots - the yield will be good". "Also it is difficult to harvest. Look at the broken roots".



Disliked: (causes storage losses due to rot when root is damaged).

"I will not plant this again because yield will be low and there will be harvest losses.

CODE FOR COMMENTS:

Criteria	Positive aspects	Negative aspects
(a) Yield		
(b) Plant height	"Medium"	
(c) Height of branching		Low - difficult to weed
(d) Resistance (disease/pests)		
(e) Period(s) for harvest		
(f) Root appearance		
(g) Root rot		
(h) Starch content	Dry, floury	
(i) Color of epidermis		White
(j) Color of flesh (pulpa)		Creamy
(k) Root position on stem		No peduncule - attached to stem
(l) No. of roots	Associated with high yield	
(m)		
(n)		
GENERAL EVALUATION		Disliked - low branching (yield) - Harvest losses (root)

A content analysis of open evaluations can be performed by tabulating the number of times each of the criteria is mentioned spontaneously by farmers. An example of the results which can be obtained with content analysis is given in Table 13. The frequency tabulation of the evaluations by farmers of cassava varieties in the previous example provides a weight for each criterion, showing the relative importance of each one to the farmers evaluating the technology. Some of the researchers' criteria shown earlier in Table 12 proved unimportant in farmers' responses; other criteria learned from farmers prove to be quite important.

The open evaluation is most valuable as an exploratory tool when farmers' criteria are not well-known. It provides a check on evaluation criteria compiled by researchers, and it ensures that criteria can be put in terms familiar to farmers, using local agricultural vocabulary. Content analysis provides a picture of what features of the technology farmers single out for comment, and what other features are of relatively less significance to them.

This approach is particularly useful when researchers want to explore a large number of alternatives with farmers, without forcing them to make a choice among alternatives, usually because evaluation is being carried out at an early stage in the research.

Eliciting preferences in farmer evaluations

The desired result of an effective farmer evaluation is a clear picture of the farmers' preferences, and the reasons or criteria used to form these preferences for one treatment or technology over another.

Table 13. Content analysis of open evaluations with farmers of cassava varieties: ten evaluations by fifteen farmers.

Farmers' criteria	Frequency mentioned[7]	
	N	%
Starch content (quality for processing)	150	100
Yield (No. of roots)	135	90
Fresh market quality[1]	130	86
Harvest date (earliness)[2]	100	66
Seed quality[3]	87	58
Plant architecture (foliage)[4]	74	49
Plant height	74	49
Easy to up-root	59	39
Distribution of roots[5]	52	34
Branching[6]	40	26
Resistance to pests	15	10

Glossary:

1 Medium-sized root, dark skin, pink epidermis, white flesh, dry (not watery) flesh preferred.

2 Size of roots, presence of new leaves indicating immaturity.

3 In good quality material, nodes close to each other; stake medulla white, not black. Poor quality indicated by few nodes, widely separated, thickened stakes.

4 Abundant foliage disliked.

5 Roots with short peduncule preferred; roots with no peduncule related to storage losses; long peduncule related to lower yield.

6 Low branching types disliked (difficult to weed); high branching types difficult to harvest.

7 Percentages calculated on the basis of 150 (10 farmers x 15 varieties).

When identifying farmers' criteria for evaluation purposes it is necessary to distinguish between descriptors and decision-making criteria. Descriptors are phrases such as: this variety is bushy, sprawling, or tall; this fertilizer cakes or is powdery; this planting distance makes walking through the trial difficult. Often many of the observations made by farmers in open evaluations are descriptors. However, the criteria that are significant for research are those which farmers take into account when forming preferences among treatments in a trial: i.e. those criteria which are crucial in deciding whether a given technology will be accepted or rejected. For example, a certain maize variety is tall and so shades the intercrop, and is therefore unacceptable: tallness in this instance is a decision-making criterion. Eliciting preferences helps to identify farmers' decision-making criteria.

There are three basic approaches which can be taken to elicit preferences in a farmer evaluation:

- Absolute evaluation: each alternative is judged on its merits; a like/dislike preference or a score is designated to each.
- Ranking among several alternatives: alternatives are ranked from best-liked to least-liked.
- Pair-wise comparison: each alternative technology is judged better or worse compared to a baseline treatment, such as the farmer's own technology, or compared to all others in a set.

These approaches can be combined in an evaluation interview. The appropriateness of any single approach for obtaining valid farmer preferences varies.

Absolute evaluation. One consideration in deciding which approach to use is the number of alternatives to be evaluated with the farmer. At an early stage in an on-farm research program, farmer evaluations should take place for a fairly wide spectrum of alternatives, so that farmers' criteria for acceptability are well-integrated into the process of screening for desirable options. Some trials, such as on-farm variety or fertilizer trials, may compare a fairly large number of alternatives. In such cases, absolute evaluation -- in which the farmer gives a like/dislike preference for each treatment on its own merits -- is often the best approach, for two reasons.

First, a farmer evaluation of trials with numerous alternatives is likely to be exploratory, an objective which farmers can appreciate. In the early stages of their contact with a new technology, farmers are often not disposed to choosing "the one best" option. This is in part because farmers, just like researchers, usually do not want to commit themselves on the basis of one experiment: they want to be assured that the results observed in one trial can be repeated in different circumstances. Therefore, they will often want to select several promising options for further testing. This is exactly what absolute evaluation allows them to do.

Second, the small farm enterprise has various different objectives which the farmer must keep in mind. Therefore, farmers are typically looking for different options which fit those objectives. Farmers may find two or three alternatives appealing, because they meet specific needs or have certain advantages; with absolute evaluation, they can in fact choose whichever options they think will fit the different objectives of their enterprise.

The absolute evaluation is, therefore, most appropriate for exploratory work when the researcher and the farmer are confronted with a large number of options, some of which must be discarded to simplify the number of treatments to be included in future on-farm trials. It is important to make this objective clear to the farmer, because he will likely be hesitant at first about making absolute statements about liking or disliking a particular treatment. (An absolute evaluation might begin with the interviewer making a statement like the one in the example).

Example: Introducing an absolute evaluation

We have planted twelve different varieties here to see how well or how badly they do in farmers' fields in this area. Each one might have some features that you like, or some that you do not like, and we need to learn about these from you, so the promising ones can be selected for testing again next season.

We have to discard some, maybe most of them, because it is very complicated to work with so many different varieties. We want you to help us decide which ones should have seed saved to plant again. This is very important, because in this way we can be sure that the varieties which continue to be tested with farmers in this region are ones which they like and will find useful.

Of course, it may be that none of the new varieties are any better than your local varieties, and it is important for us to understand why, so that next time we have a better idea of what will be useful for farmers like you. So let's look at each of these in turn, and I would like you to explain to me what you like or dislike about it....

In exploratory work, absolute evaluation is often a "negative" evaluation in which the researcher is likely to be most interested in identifying farmers' criteria for rejecting alternatives. For this reason, it is especially important to clarify with the farmer the researcher's neutrality, and receptivity to honest criticism.

After the farmer gives his comments on a specific treatment, and these are discussed with the use of probing and open questions and recorded, the interviewer can ask sum up by asking the farmer questions such as:

- Do you think this variety deserves to be planted again next season?

- Should we continue to evaluate it?

- Shall we drop this from the next trial?

The number of times individual farmers indicate "like" or "dislike" in relation to such questions can be tabulated. If, as is often the case with technology observed by them for the first time, farmers want to "wait and see" rather than categorically qualify each new option, a scale can be used instead. Each option can be judged on its own merits as good, indifferent, poor for example; or assigned from one to five "stars" or another culturally appropriate symbol can be used. Scores can be assigned (eg. 3 = good; 2 = indifferent; 1 = poor) for simple tabulations or non-parametric statistical analysis.

Whatever approach is used, an exploratory open evaluation prior to scoring with the farmer will generally always be useful to help the interviewer comprehend how and why the farmer qualifies a given technology.

The most insightful information in an absolute evaluation is obtained not from checking off "likes" or "dislikes", but from having the farmer talk through his perceptions of the technology and give his criteria for acceptability, which can then be used to guide further research.

Ranking among several alternatives. Ranking involves asking the farmer to place various alternatives in order of preference, eg. first, second, third, etc. This technique can be applied to obtain an overall preference ranking, after which the farmer is asked to explain the criteria on which his or her selection is based. Most people find ranking entertaining because it is rather like a game. It is also often insightful for both "players", as much for the farmer as for the researcher, because it involves consciously ordering and articulating ideas which may seem obvious or intuitive to the farmer, and on which it is interesting to reflect and comment. In order to make ranking meaningful for both "players", the researcher needs to plan ahead of time: 1) the number of items in a set that the farmer will be asked to rank; 2) how to help farmers to order items in some concrete or manipulable fashion (ie. by physically putting them in order).

The number of items to rank. Ranking is readily applied only when the number of alternatives the farmer is being asked to put in order is small (eg. not more than six). The technique of ranking does not necessarily require, however, that the total number of alternatives that can be evaluated with this method at anyone time has to be so restricted. An evaluation interview of a trial which includes, for example, ten different treatments can begin with an absolute evaluation in order to sort out a subgroup of the three or four most promising treatments from the farmer's point of view, and then proceed with the farmer ranking these three or four best-liked alternatives in order of preference.

Equally important to an evaluation is understanding why certain treatments are rejected by the farmer. A subgroup of the three or four least-promising treatments can be selected by the farmer, who can then rank them in order from worst upwards. Finally the remaining middle group of treatments - neither preferred, nor the least-liked, can then be discussed. It is possible for farmers to rank alternatives in this middle set, though often this is difficult for them to do if the alternatives are all quite similar.

The Best and the Worst Technology

Sometimes the array of different technologies which the farmer evaluates does not include an example of "the best" or "the worst". Even if he or she feels likewarm about all the options, the farmer may rank them in order, and this ranking can give a misleading impression that the first-ranking is also "the best".

For this reason it is useful to conclude preference ranking by asking "What would your ideal variety (cropping system, planting density, etc) look like?" "What would its opposite - the worst possible - look like?" How does what you have seen here compare? "What would happen if you could/couldn't irrigate at this point?" Examining opposites (types of technology, cultural practices, or crops vs livestock for example) helps to elicit farmers' key criteria for defining "the best" and "the worst".

Helping farmers to rank. In order to rank up to six different alternatives farmers often need to be able to order the different items visually. At harvest time, sacks of grain can be ordered; in consumption evaluations, dishes can likewise be moved about to obtain a rank ordering. Symbols colors or names can be assigned to the different alternatives to help the farmer remember and differentiate alternatives. This is especially necessary if these alternatives cannot be readily ordered

physically, as when evaluation of different treatments is taking place in the standing crop. In a trial different colored flags or markers can be placed in each treatment with the farmer during the prior open evaluation. Then colors representing treatments can be ranked. Instead of physically manipulating the alternatives, or symbols representing them, farmers can allocate pebbles or counters to each option, to indicate the importance or weight they give to each. In any case, it is important to give the farmer the opportunity to physically sort, to order, and re-order.

Understanding the farmers' reasoning. A useful technique is to ask the farmer "to think aloud while ordering": this gives the researcher insights into the farmers' reasoning and clues for formulating open questions to identify the farmers' criteria for a particular preference ranking.

The technique of ranking among alternatives needs to be exercised with caution. It is only too easy to rely too much on the simple act of assigning first, second, third, etc to a set of items, with the risk that the interviewer may be forcing the farmer to make a simplistic ordering of treatments which does not reflect his or her complex set of decision-making criteria. For example, a farmer may select one alternative as preferable for one set of conditions in the farming system, but may perceive a different alternative as equally desirable for a different set of conditions. In other words, a farmer is quite likely to be considering several different objectives when evaluating a new technology.

For this reason, it is extremely important to ask the farmer to clarify his reasons for a given ranking. This is done by combining the use of ranking with open questions which ask "Why is this one better than the one you placed below it?" and "Why is this one not as good as the one you placed ahead of it?"

In fact, ranking as a technique for obtaining farmer evaluations is useful primarily as a tool for getting farmers to explain their preferences. Some feature of a variety, management technique, or other technology may seem so obvious to a farmer that he does not mention it. The exercise of ranking is a stimulus for the farmer to think through and articulate such considerations which it may be important for researchers to know about.

The farmers' criteria obtained from open evaluations can be precoded as reasons for preferring or rejecting alternatives, as illustrated in Table 14. In this example, the interviewer fills in the ranking given by the farmer and then precoded numbers are assigned to different reasons for this ranking. This greatly simplifies recording the farmer's evaluation.

Matrix ranking

The researcher can get additional insight into a farmer's criteria by asking him to rank several treatments with respect to specific criteria which have been identified previously. This technique called matrix ranking or grid ranking, is illustrated in Table 15, where the interviewer has asked the farmer to rank the four best liked bean varieties with respect to yield, growth habit, disease resistance, marketability (color and size of grain) and eating quality. The interviewer begins with the question:

> "Which of the four varieties you have selected is best with respect to yield? Which would you put in second place? ... (third and fourth place).

The ranking is repeated with respect to each criterion of interest.

TABLE 14. Example of interview format for ranking of treatments in a farmer evaluation.

FARMER EVALUATION:
MAIZE-BEAN ASSOCIATIONS

Could you tell me if there are any of the different planting systems in the trial you would like to try out again? Can you tell me which you like best, and then the next best, and so on?

TREATMENT	NAME/ SYMBOL	RANK	REASONS (see code)
Maize-bush bean// potato rotation			
Maize-climbing bean// barley relay crop			
Maize-climbing bean// fallow			

CODE:

(1) It is possible to harvest maize and bush beans together and so plant potatoes in rotation afterwards.

(2) The maize is late and makes weeding of the barley relay crop difficult.

(3) The climbing bean can be harvested at several different times to take advantage of different prices.

(4) The fallow//maize stubble are needed for livestock.

(5) The maize is not strong enough to support the climbing bean.

(6) Other; specify _____

TABLE 15. Example of Matrix Ranking of different varieties in a farmer evaluation.

Bean Variety	overall ranking	CRITERIA: Yield potential	Growth habit	Disease resistance	Marketability: Color	Marketability: Grain size	Eating Quality
"Perrito"	1	1	3	1	3	4	1
"Radical"	2	4	4	3	1	1	2
A-36	3	3	2	2	2	2	4
AND-336	4	2	1	4	4	3	3

In the example in Table 15 the variety placed first overall by the farmer, was ranked highest in terms of yield, disease resistance, and eating quality. The variety placed second, was ranked lowest in yield, but highest in marketability. The farmer's explanation was as follows: "This variety (Perrito) is very good for consumption, it is very hardy (ie. disease resistant) and it yields well. Radical on the hand, is easier to market, but it is a lot of trouble, you have to be very attentive to the disease problem, and its yield is low." In this case, the farmer gave priority to consumption objectives when ranking the varieties in order of preference, and the matrix ranking helps to clarify this.

Table 16 shows example of matrix ranking of rice varieties carried out separately with researchers and with small farmers in India. The results illustrate the difference between researchers' and the farmers' preference ranking, with respect to the variety Rasi for example. The usefulness of matrix ranking depends on the number of items and criteria of interest to the researcher. With a large matrix, the procedure becomes tiring and the farmer's answers may become mechanical. Matrix ranking is most appropriate when the researcher wants to obtain precise information about the relationships among several different criteria, and wishes to rank only a few alternatives.

Pairwise comparison. With pairwise comparison each alternative can be judged better or worse than another, while reasons for this judgement are given. This technique rapidly becomes tedious if more than six items are being compared, so that it is best used once a reduced number of alternatives has been identified. In a set of multiple alternatives, a reduced number can be obtained from an absolute evaluation done previously on the entire set. The alternatives may be those identified by the farmer, or treatments of particular interest to

TABLE 16. Criteria and ranking for Paddy varieties by 14 farmers (4-10 bighas) at Village Nemaipur, District-Bankura on 29.4.1988.

Criteria	Paddy varieties					
	Rasi	IR-50	IR-36	Hiramoti	Masuri	Nagrasal
Farmers'						
1. Resistance to pests	1	6	5	4	3	2
2. Drought resistant	1	3	4	2	5	6
3. Length of straw for thatching	4	5	5	3	2	1
4. Market price	4	3	3	4	1	2
5. Suitable for light soil	1	2	1	2	-	-
6. Eating quality	4	2	2	3	5	1
7. Suitable for bolk kharif - 2 Rabi	1	1	1	-	-	-
8. Recovery of aged seedings	4	4	4	3	2	1
Researchers						
1. Tolerance to deep water	5	4	3	6	2	1
2. Height of straw	4	6	5	3	2	1
3. Milling recovery percentage	2	5	5	4	3	1
4. Seed available locally	4	3	2	4	4	1
5. Yield per bighor	4	3	1	6	2	5
6. Length of panicle	4	3	2	1	1	1
7. Suitable for high fertilizer dose	3	3	1	5	2	5

NOTE: 1 - stands for best and 6 stands for worst.
SOURCE: Chambers (1988).

the researcher. Complete pairwise comparison can be carried out on three or four alternatives for example, in the following way: all alternatives are compared with each other: A with B, A with C, A with D; B with C, B with D; C with D. Appendix I shows a form with which pairwise comparison can be recorded and scored.

This technique requires the items to be compared to be readily differentiated. Treatments in a trial can be given simple names, for example, or symbols can be used to represent each treatment, and then shown to the farmer in pairs.

Alternatively partial pairwise comparison takes one treatment, such as the farmers' current technology as a base for comparison and all other treatments are discussed in relation to this base.

The disadvantage of this technique when the base for comparison is the farmer's current technology is that the researcher implicitly introduces into the evaluation an element of competition between the farmer's normal practices and new alternatives. This can bias farmers' responses, because either they resent having to criticize their own practices, or they are too courteous or deferential in this instance to criticize the researcher's alternatives. The success of direct comparison between new technology and the farmer's current technology as an evaluation technique depends vitally, therefore, on the research staff convincing the farmer of their neutrality, their serious intent to learn, and their genuine esteem for the farmer's normal practices. A useful way of initiating this type of pairwise comparison is, therefore, to begin with statements like the following:

> "Several farmers like yourself have explained to me that your usual practice of planting cassava stakes at an angle to the slope has several advantages. Now in this parcel we tried a different method by planting the stakes upright. I would like to learn more about the advantages or disadvantages of these two methods. What do you think of planting upright compared to planting at an angle?"

Another time to use the technique of pairwise comparison is when a farmer readily identifies an outstanding best (or worst) option among treatments in a trial. In this case, the researcher can use the outstanding treatment as a base for comparison with other treatments of interest.

As with ranking, a pairwise comparison can bias information about farmers' preferences by forcing the farmer to express an either-or preference. Different alternatives may be equally appealing, while not "better" than others. Thus in pairwise comparison it is essential to explore the farmers' reasons and criteria used for choosing one alternative over another; it is not wise to force choices without obtaining an understanding of any reluctance or difficulty the farmer may have in making a judgement between two alternatives, through the use of open questions.

Pairwise comparison can also be used to ask farmers to rank criteria. This can be a useful technique once the relevant set of evaluation criteria have been identified, and the researcher is interested in deriving weights for different criteria. The result is similar to the frequency tabulation derived from content analysis of open evaluations.

Disaggregating rankings for analysis. Ranking by farmers can lead to confusing or contradictory results when the information from several evaluation interviews is pooled, because different farmers have had different objectives in mind when they made their ranking. Table 17 gives an example using the results of 9 farmer evaluations which shows that the local check was preferred over all others in the set. The varieties "Perrito" and "Radical" obtained similar total scores. However, they were selected by farmers for very different reasons. Farmers who

selected Perrito in preference to Radical reasoned that it is good for consumption purposes and requires little labor; farmers who gave Perrito a low ranking said it was too difficult to market.

TABLE 17. Pooled rankings from 9 farmer evaluations of five bean varieties.

Variety	Individual farmer ranking[1]									Total score	Overall rank[1]
	1	2	3	4	5	6	7	8	9		
Perrito	5	1	4	2	1	2	5	4	5	29	3
Radical	1	5	2	5	5	5	2	2	4	31	4
A-36	2	2	4	1	4	1	4	1	1	20	1
ZAA79	4	3	1	3	3	3	1	4	3	25	2
Local check	3	4	5	4	2	4	3	5	2	32	5

[1] Score 5 = best ; 1 = worst.

Dividing farmers into two groups according to the reasons they gave for their ranking of Perrito shows a very different pattern: Group 1 said "Perrito is difficult to market"; Group 2 said "Perrito is good for consumption purposes". Farmers who are market-oriented (Group 1 in Table 18) ranked Radical higher than Perrito or the local check. Farmers who gave priority to consumption objectives (Group 2 in Table 18) ranked Perrito highest. Disaggregating groups of farmers according to the reasons they gave, for different rankings can assist therefore, in identifying underlying patterns of preference.

TABLE 18. Disaggregated rankings from 9 farmer evaluations of bean varieties.

GROUP 1. Perrito is difficult to market

Variety	Individual farmer rankings[1] 2	4	5	6	Total score	Overall rank[1]
Perrito	1	2	1	2	6	1
Radical	5	5	5	5	20	5
A-36	2	1	4	1	8	2
ZAA79	3	3	3	3	12	3
Local check	4	4	2	4	18	4

GROUP 2. Perrito is good for consumption purposes

Variety	Individual farmer rankings[1] 1	3	7	8	9	Total score	Overall rank[1]
Perrito	5	4	5	4	5	23	5
Radical	1	2	2	2	4	11	1
A-36	2	4	4	1	1	12	2
ZAA79	4	1	1	4	3	13	3
Local check	3	5	3	5	2	18	4

[1] Score 5 = best ; 1 = worst.

IX. GROUP EVALUATIONS

Advantages and disadvantages of group evaluations.

Evaluating technology with groups of farmers is appropriate when researchers want to "test the waters" and form an impression in a short time of farmers' reactions to new technology. Group evaluations can also be used to evaluate large numbers of alternatives with farmers, especially when this represents a tedious and exhausting task for an individual. Finally, group evaluations are useful for providing feedback to farmers about results of previous trials or evaluations, to obtain their interpretation of these results.

TABLE 19

WHEN TO USE GROUP EVALUATIONS

1. For exploratory research when farmers' preferences are relatively unknown.
2. For obtaining farmers' reactions to a relatively large number of alternatives which are too numerous for one individual to evaluate.
3. As a follow-up to and in the interpretation of results obtained from previous evaluations.

Evaluating technology with groups of farmers is, as a rule, most productive in exploratory stages of research when farmers' criteria for acceptability are not well known to researchers.

Group evaluations can have several functions. They enable researchers to learn from the exchange of ideas among farmers. They can help farmers overcome their inhibitions about expressing their ideas or criticisms in front of researchers. And they can encourage farmers to express and discuss their differences of opinion. The group discussion is especially useful when the concepts and decision-making processes of farmers with respect to

different attributes of the technology need to be specified in order to plan further evaluations: when, where, and with whom to conduct these.

A group evaluation can be used as a substitute for two or three initial individual open evaluations when researchers are beginning to develop the evaluation interview format, as described earlier. Discussion and dissent within a group can be especially fruitful in helping researchers to understand which evaluation criteria are held in common among farmers, and which may reflect individual farmers' different objectives or available resources. The researcher can ask the group to explain why opinions on the usefulness of a new technique or input differ among group members. Explanations may also arise spontaneously as, for example, when one farmer makes comments to another such as "That is no problem for you, because you have your own ox team for ploughing"; or "You always get plenty of irrigation water early in the day, but I sometimes don't get any at all"; or "You may be willing to weed after the rains start, but I want to harvest my coffee then, so I won't have time...."

Another important function of group evaluations of technology is that they can give researchers the opportunity to report results to farmers, such as the range and averages of yields, profits, costs, and preferences obtained from trials conducted in a region or community. Individual farmers cannot know or appreciate these results from the single trial in which they may have taken part. Discussion among farmers can then help to interpret variability in preferences obtained previously from individual evaluations.

TABLE 20

USING GROUP EVALUATIONS

FOR EXPLORATORY RESEARCH ON FARMERS' PREFERENCES

- Researchers can learn about the concepts and decision-making processes of farmers' by observing them interact and by listening to their language and discussion while they evaluate the new tecnology.
- Researchers can develop ideas with farmers for planning evaluation interviews: when, where, and with whom to carry out future evaluations.
- Researchers can obtain in a short time the reactions of farmers to different attributes of the technology, as an aid to designing an evaluation interview format.
- Researchers can obtain an overview of the diversity of preferences held by farmers.

Group evaluations can also be used to broaden the social base or representativeness of farmers from whom evaluations are being sought. For example, it is often the case in on-farm research that trials are situated with farmers who are better off and therefore have the land to devote to a trial, or with those who are willing to take the risks of experimentation. A trial with one relatively poor farmer (or any type of farmer underrepresented among trial participants) can be used as the focus for a group evaluation with a number of farmers of a similar type who have been unable to participate in trials, thus enabling researchers to get a larger number of farmers' opinions from the evaluation interview.

By using some of the techniques discussed below for group evaluations, farmers' reactions to relatively complex or numerous sets of alternatives can be explored with a number of farmers in a relatively short time. Often these results cannot be achieved with individual evaluations, because one farmer will usually be overwhelmed by the task of evaluating twenty or thirty varieties,

for example, and will lose interest in carrying it out. The same task, however, can be divided up among groups, and group reactions can be pooled. Group interactions also help to motivate and sustain farmers' interest in carrying out evaluations of large numbers of alternatives.

One of the great advantages of group evaluations in the exploratory stages of designing technologies for testing with farmers is the efficient use of staff. The ratio of staff time to farmer contact can be greatly improved by working with groups. Group evaluations require that not only farmers work as a group, but also researchers, for they must be able to manage group dynamics and record information. This brings researchers together to talk with farmers and to pool their findings. Also, interacting with and obtaining feedback from ten to twenty farmers in only two or three hours may be more appealing to a station researcher than meeting with three to six farmers in individual interviews during a long day of field visits. Thus, the group evaluation can be a valuable mechanism for making dialogue with farmers feasible for station researchers whose contact with farmers is otherwise limited.

Despite all these clear advantages of group evaluations, there are some important disadvantages that must be considered. For example, the usefulness of group evaluations for exploratory purposes depends on how easy it is for farmers to interact within a group. If the attributes of the technology involve some sensitive topic, such as the way in which farmers and middlemen negotiate prices, or the quality of the family's diet (a question of social status), for example, then relevant opinions may be withheld in a group discussion. Some farmers may be inhibited in a group situation, while one or two other individuals may tend to dominate the interaction. In such cases a false consensus appears which gives invalid and misleading conclusions about

farmers' opinions of the technology being evaluated. There are several techniques to help the researcher conducting a group evaluation overcome or minimize the risks of a false consensus being imposed, but this requires some preparation and practice in managing group dynamics. Such skills are not always readily available to an agricultural research team. In general, group evaluations are not appropriate for obtaining a head-count or quantitative analysis of farmer preferences because of the tendency of groups to impose consensus on their members.

The efficiency aspect of group evaluations should not be exagerated. Much depends on how much time has to be spent on motivating farmers to attend a group evaluation, or even just on informing them of the time and place of the event, and on the logistics of getting the group together in one place. Only if this preliminary work can be reliably delegated so that researchers do not have to make numerous visits to individual farmers, is their time being used efficiently.

But even before the researcher deals with the logistics and efficiency of his group evaluations, he must choose a group to work with. How groups of farmers are to be formed or existing groups are to be tapped needs to be seriously considered. Before organizing a group evaluation, it will usually be necessary to carry out some assessment of how culturally acceptable a group is, and on what social status, cultural, ethnic, or other basis groups can be formed or already exist.

Groups that exist or are culturally appropriate may not necessarily fit research purposes. For example, groups of neighbors are logistically the easiest to work with in areas where farmers live on scattered farmsteads and not in villages or clustered settlements. However, such a group may include farmers of widely variant social statuses, which will inhibit group interaction and may invalidate the results of a group evaluation.

Groups of "expert farmers" and/or participants in trials are often most desirable for exploratory research purposes, but these may have to be drawn together from a relatively large area which poses problems of transportation and motivation to attend. If farmer participation in a group evaluation relies on self-selection, such groups may include farmers who have the time and other means to attend a meeting, and exclude those who lack such resources, thus potentially biasing results.

Then there are the already existing groups of farmers who work together in shared labor groups, for example. These can be easily convened but are likely to represent a particular social class, caste, or set of resource constraints; their preferences may therefore represent only a minority of potential users of the technology. Thus, if group evaluations are to produce valid results, the selection of the group itself must be done with great care.

The advantages and disadvantages of group evaluations, which are discussed above and summarized in Table 21, can only be properly weighed if the objectives of the evaluation and the type of information the researchers hope to obtain are clear from the outset. The following section discusses several procedures for setting up group evaluations.

Setting up group evaluations.

In setting up group evaluations, researchers must make several decisions about how to design and implement the evaluation. These decisions involve determining the objectives of the evaluation, how to form the groups for evaluation purposes, the number and size of groups required, the number of technological alternatives to be evaluated, as well as the logistics of timing and location.

TABLE 21. Advantages and disadvantages of group evaluations.

Advantages	Disadvantages
. Group interaction stimulates discussion of evaluation criteria, especially when there are conflicting opinions.	. Groups can be dominated or inhibited, to to produce false consensus and misleading evaluations, because of peer pressure.
	. Members will often withhold opinions on sensitive subjects unlikely to be discussed openly in a group.
	. Group activity must be culturally acceptable.
	. Farmers can get tired of repetitive meetings.
. Group interaction helps to motivate farmers and sustain interest in an evaluation.	. Groups are less reliable for quantifying farmer preferences because group members influence each other.
. Group interaction is especially useful for exploratory work.	. Identifying or forming groups that represent user populations or fit research purposes may be logistically difficult, or time-consuming when respondents are geographically disperesed.
. Groups can divide up complex or numerous alternatives to be evaluated, and pool opinions.	
. Groups can provide overview of variable results, and can be valuable for feedback of results to farmers.	
. Ratio of staff time to farmer contact can be more efficient.	
. Group evaluations can provide immediate feedback to station-researchers.	
. Groups can be used to increase evaluations with types of farmers under-represented in on-farm trials.	

The objectives of a group evaluation depend in large part on whether the evaluation research is at an exploratory stage, or at a stage when interpretation of results can be carried out with a group of farmers. In exploratory work, researchers may want to carry out a group evaluation as a first step towards a series of individual evaluation interviews; or the group evaluation may itself be the main primary data collection method, especially if researchers want to learn about farmers' reactions to a large number of alternative technologies. A group evaluation may have a very specific objective: for example, to discover the acceptability to women of several maize varieties for preparation of flour in the home. Or the objective may be quite general: for example, to asses how farmers will react to different combinations of pasture grasses, forage legumes, forage trees, and other crops for purposes of erosion control, fuel and animal feed on the farm. The composition of the group and the number of groups required will vary, depending on the objective of the evaluation.

Forming groups for evaluation purposes. The composition of a group of farmers will determine in several important ways the information that will be forthcoming from a group evaluation. The participants selected will determine, first of all, the quality of the dialogue between the farmers and the researcher; and second of all, the effectiveness of the exchanges among the participants themselves. There are two critical factors that affect interaction within the group, and that need serious consideration:

- The importance to the evaluation objectives of shared or common interests among the participants in a group.

- The effect of social status differences among participants on group dynamics.

In general, the more specific the evaluation objectives are, the more important it will be for researchers to form a group with farmers who have clearly defined common interests and/or expertise and experience. It is usually frustrating for experienced farmers to have to spend time listening to the inexperienced, for example. For example, the participants in the group evaluation of maize varieties for milling purposes should be women for whom preparation of maize flour is a significant activity, otherwise the evaluation criteria will not be valid.

In a group evaluation of multipurpose technologies for erosion control, fuel and animal feed, an exploratory group evaluation might deliberately bring together a diverse group. This group might include for example male farmers' who raise cattle, their wives who collect firewood and also feed pigs or goats, as well as others who principally grow crops. The purpose of convening a diverse group is to learn from the discussion among potentially conflicting points of view. The results may help the researchers to define the different, homogeneous groups with which separate group evaluations would be carried out later on to obtain a detailed understanding of their different points of view on acceptability. Another case where it may be important to mix participants of different statuses, is when joint decisions about use of a technology are likely to occur -- between husband and wife for example.

A disadvantage of homogeneity of the group is that this can complicate the logistics of convening its members. If interest group members are not located adjacent to each other, but are scattered throughout an area or if researchers plan to work with the same group on different occasions (a panel) for farmer evaluations, then the meetings must be easily convened. A clear advantage, on the other hand, is that homogeneity will have a positive effect on group dynamics: farmers with common interests are likely to communicate effectively with each other.

However the heterogeneity of a group can make effective communication among group members difficult, especially if divergent interests are correlated with differences in social status. Such differences, illusted in Table 22, can lead to dominance of group interaction by the higher-status members, such as the wealthier, older, or male farmers, and to deference to their opinions on the part of lower-status members, such as the poorer, younger, or female farmers.

TABLE 22. Examples of social status differences among farmers which can influence group dynamics.

Higher status (dominant)		Lower status (deferent)
Wealthy	vs	Poor
Old	vs	Young
Land-owners	vs	Tenants, laborers
Male	vs	Female
Commercial producers	vs	Subsistence producers
Technical elite	vs	Traditional
Political leaders	vs	Followers
Ethnic majority	vs	Ethnic minority
Father/husband	vs	Wife, sons, daughters
High caste	vs	Low caste
Experienced, "expert"	vs	Inexperienced

An important task in group formation for farmer evaluations is therefore to identify the criteria for selecting participant farmers, taking into account those characteristics of farmers which are likely to be detrimental to or beneficial for achieving a free exchange of views within the group. A rapid method for assessing these criteria/characteristics is to draw up lists of

farmers who can mix together socially with key informants knowledgeable about community politics, family rivalries and other status differences likely to be important in group interaction in the research area.

In general group evaluations will be more effective if there are several relatively homogeneous interest groups, each carrying out its own evaluations, than if all participants are indiscriminately mixed together to form one group.

Researchers will not always be able to work with a strictly homogenous group, however. In exploratory work, for example, when a primary objective of farmer evaluations is to map the range of criteria and concepts farmers will bring to bear on decisions about the acceptability of a technical innovation, it may be desirable to work with relatively heterogenous groups. In such a case, techniques for managing group dynamics can be used so as to prevent some group participants from dominating others in a discussion.

How many group evaluations are needed

The number of group evaluations needed will depend on the following considerations:

- How diverse is the user population?
- Is the group evaluation an exploratory one, prior to further individual evaluations, or
- Is the group evaluation the primary data collection method?

If the user population is very diverse, with respect to geographical location or to the status differences illustrated in Table 22 for example, and the group evaluation is the primary data collection method (ie. there will be no individual

evaluation interviews), then researchers need to conduct numerous group evaluations. At least two evaluation sessions will be needed for each type of farmer or interest group which the researchers' expect to have different points of view about the usefulness of a technology: eg.

- Older men; women; adolescents and youths.
- Farmers with oxen; farmers who rent oxen; farmers who don't use oxen.
- Farmers who spray agrochemicals; and farmers who don't.
- Farmers who produce for market; and farmers who produce primarily for consumption.
- Farmers who live in the valleys; farmers who live in the hills.

Conducting at least two evaluation sessions enables researchers to check whether the criteria obtained from one group are broadly comparable to those obtained from another group with similar participants.

If two similar groups provide strikingly different evaluations, it is necessary to continue evaluating with additional groups to find out why ideas have diverged. A rule of thumb is to keep on conducting group evaluations until the information obtained is being repeated without uncovering any novel ideas, criteria, or preferences. This repetition of findings tells the researchers that the results from the group evaluations are reliable.

How many farmers should participate in a group evaluation

Researchers can make the decision about how many participants to include in a group evaluation on the basis of:

. the number of qualified moderators available at one time.

- the availability of a congenial setting,
- the ease of convening a given number of farmers.

For group evaluations, one person should not moderate a small group of more than ten individuals. In general, the group evaluation will be more productive and satisfying for everyone if the small group numbers no more than five or six farmers.

TABLE 23. Advantages of small groups (of not more than six farmers) for evaluations.

. Each individual gets more time to speak than in a larger group.
. Less frustration is likely to arise, because it is easier to get a turn to speak.
. There is less reason for any one person to monopolize the attention of the group when everyone gets a turn easily.
. There is less likelihood for frustrated individuals to start conversations on their own.
. It is easier for discussion among the participants to gain momentum, and the moderator can take a back seat.

Group evaluations can be carried out with several small groups of five or six farmers working independently, so long as each has a moderator, so that the total number of participants can reach 30-40 farmers if so desired. Different groups may be a way of replicating in a single session, the information obtained. Or farmers can be invited to divide themselves up into different interest groups and each group gives a different perspective.

In a group evaluation consisting of several small groups, each group can present its conclusions to the other groups in a plenary session. This takes more time but helps the group as a whole, especially if it has an autonomous existence for reasons other than the evaluations, to realize a sense of closure or achievement about the activity. Sharing results is also important for enabling a community to articulate a position, or series of positions in relation to proposed technological innovation.

Whether one group or several groups of five to six farmers are taking part in a group evaluation, it is important for each group to have a space where they can:

- be comfortable (eg. out of the sun)
- be uninterrupted by non-participants (eg. curious neighbors, casual passers-by)
- easily hear each other speak, and the moderator can hear all of them.

A group evaluation often works better in a setting such as a farmhouse, shade tree, field or other familiar location where the participants feel at home. Nonetheless, the group is useful for overcoming inhibitions in an unfamiliar setting that might cripple an individual evaluation interview. For example, groups are a good way to give farmers confidence in evaluations carried out on experiment stations.

Moderators' skills for group evaluations

Working with groups of farmers to evaluate technologies requires some special skills in managing communication and group interaction. But most group moderator skills are similar to those face-to-face communication skills discussed earlier and can be developed with practice first in individual evaluations, and then in groups.

The most important ingredient in a sucessful group evaluation is a moderator who is able to listen to farmers and encourage genuine discussion among them. The effective moderator stimulates farmers to discuss the technology among themselves and does not try to force a consensus. A group evaluation of technology is not an opportunity to teach farmers, and should never be combined with an extension meeting for this purpose.

Some essential characteristics to look for when selecting moderators for group evaluations with farmers are summarized in Table 24. Among these, the ability to give feedback to problem participants is one skill which is especially helpful in improving the reliability of evaluation, and in giving the moderator confidence in his or her ability to facilitate the group discussion. Inexperienced moderators can be more effective if they work in pairs: one manages the discussion; the other observes the participants and takes notes. Team work is useful for training group moderators because each gives the other feedback on how the evaluation was conducted and on the results obtained.

TABLE 24. Moderator skills for group evaluation.

. Good listening and probing skills.
. Feels comfortable with groups of farmers.
. Familiarity with the technology being evaluated.
. Familiarity with local agricultural vocabulary and customs.
. Able to memorize and keep the discussion within the question plan or flowchart.
. Able to use open questions.
. Able to give feedback to problem participants.
. Able to keep notes unobtrusively.
. Stimulates group members to talk to each other.
. Able to synthesize the criteria and opinions discussed by the group (written or verbally).

Problem participants in group evaluations

Dominating talkers: This type of participant is often a community leader or political figure, or may be a middleman or well-to-do landowner to whom others defer. Or the dominant

talker may simply be a farmer who needs to assert his authority and knowledge in front of others. This person tries to claim all the moderator's attention, to initiate topics in the discussion, to influence other farmers in the group, and usually insists on having the last word.

Strategies for minimizing the ability of one vocal, opinionated individual to dominate a group evaluation include:

- The moderator summarizes what has been said so far, and tells the dominating talker that it is time to let less outspoken group members give their opinions.

- The moderator thanks the dominant participant for his or her comments and raises a new theme for discussion inviting another farmer to comment.

- The moderator uses body language: avoids eye contact, turns sideways from the dominating participant.

However, the ability of one or two individuals to dominate a group evaluation often arises from social status differences or cultural values placed on consensus, which inhibit a free exhange of opinions in a group situation, in spite of the moderator's best efforts.

Assigning a moderator and a note-taker to each small group can greatly assist in managing tendencies of high-status individuals to dominate group discussion. The note-taker should be observing group interaction and, if he or she sees that certain farmers are passive or deferring to others who are more outspoken, should take an active role in drawing these farmers to one side to hear their opinions, essentially creating another sub-group. Alternatively the note-taker can take the dominating

STRATEGY FOR
SEPARATING DOMINATING AND PASSIVE
PARTICIPANTS IN A GROUP EVALUATION

Twenty small farmers who are expert cassava producers were brought together to evaluate an on-farm regional variety trial. Small groups were formed, each with a moderator and a note-taker. Each group started out at a different treatment to walk through an evaluation of the whole trial. In one group, the note-taker observed during the discussion of the first treatment that two farmers dominated the discussion. They were evaluating the variety exclusively in terms of market qualities, while dismissing the importance of management aspects related to planting distances and weeding requirements. The note-taker began, therefore, to talk unobtrusively with the other more passive members of the group, while the two dominant farmers interacted with the moderator. The note-taker found out from the other farmers that one of the two dominant group members was a relatively better-off farmer widely respected as an expert in cassava throughout the community because of his age and experience, and who contracted labor through his sons; he himself no longer actively worked in planting cassava. The other dominating farmer was a community leader and cassava middle-man. The note-taker was able to elicit opinions from the more passive farmers about planting distances and the amount of labor involved in weeding related to the cassava plant architecture. These opinions were included in the notes on the evaluation. The moderator's notes on the dominant farmers' evaluation did not include such criteria.

participants aside, preferably to another location, explaining that because they are so knowledgeable, a separate session will be conducted with them.

Passive participants: Farmers who say little in groups may be shy or deferent to higher-status group members, but they often can be insightful and incisive evaluators. Techniques for encouraging passive participants include:

- Single these farmers out for informal conversation while the group is still convening, and emphasize the importance and interest of what they have to say for the group.

- Use eye contact and body language to encourage them to speak.

- Be alert to see when this type of farmer is on the verge of speaking, and invite a comment.

- Invite comments from or direct straightforward questions at the passive participant; be positive and thank them for a contribution to the discussion.

The dependent participant: This is a deferential type of farmer who wants to express how grateful he or she is for the meeting (trials, visits to farms, etc); who wants to please the researcher-moderator and, who has difficulty expressing honest criticism. When asked to comment on problems or criticisms, this type of farmer often turns to the moderator to ask for recommendations and more help or technical assistance. This farmer may also repeatedly ask the moderator to give his opinion or recommendation.

Techniques for overcoming uncritical deference include:

- Screening for this type of farmer when selecting group participants.

- Reaffirm neutrality - "some people I've talked to agree with you; but some people say the opposite: why might that be?"

- Emphasize the importance of finding out flaws and problems in the technology before making recommendations: the cost to farmers of faulty recommendations.

- Try saying "of course I have an opinion, but the purpose of this meeting is to learn about your ideas and opinions..."

The hostile participant: This type of farmer frequently is using the group session to convey frustration with officialdom as represented by any outsider. The hostility may or may not have direct association with the research. This participant may criticize the moderator personally, or other participant's ideas.

- Try to establish factual criticisms and how these relate to the technology or the way trials are carried out.

- Acknowledge the farmer's feelings ("I can see you're very angry about this and I'd like to understand better ...")

- Re-emphasize the objectives of the evaluation; what researchers can and cannot do; and what farmers can and cannot hope to obtain from the collaboration.

- Silence on the part of the moderator can encourage other members of the group to defuse the hostile participant.

- The moderator can ask other participants to comment on the hostile person's statement: "That's something I haven't heard before: What do you and others in the group think?"

The rambling talker: This type of farmer often has relevant opinions but is unable to get to the point in a short time. He or she may communicate opinions by illustration, example, and even stories, rather than by synthesizing them.

- The moderator has to be aware that this may be a normal rhythm of communication in the farmers' culture, and should respect it.

- Be aware of other farmers' body language and response to the rambling talker (are they relaxed and attentive? Are they restless, looking aside, talking among themselves?)

- If the group is uncomfortable, the moderator's eye contact with the rambling talker should be broken; any pause should be used to probe or pose a question; finally the moderator can say "Thank you. That's very interesting. Now lets hear from someone else", (turns to another group member).

Initiating and closing a group evaluation. Like any individual evaluation interview, the group evaluation goes through the stages of warm up, development, and closure. In a group evaluation, the warm up begins with informal small talk among farmers, in which moderators should take part, while the participants are assembling. This is an opportunity for the moderator to talk to farmers on a one-to-one basis about the purpose of the meeting, without touching on their opinions of the technology. If not known, names and faces of farmers can be memorized by the moderators, and dominant or passive types of participant observed. As in individual evaluations, an effective group evaluation depends on a clear understanding among participants of the objectives of the group and of the researchers. Sometimes researchers may decide to conduct an evaluation with a group of farmers unfamiliar with the technology or the on-farm trials. This might be a group formed for evaluation of an on-station trial for example. In any case, it is especially important to begin a group evaluation with a brief

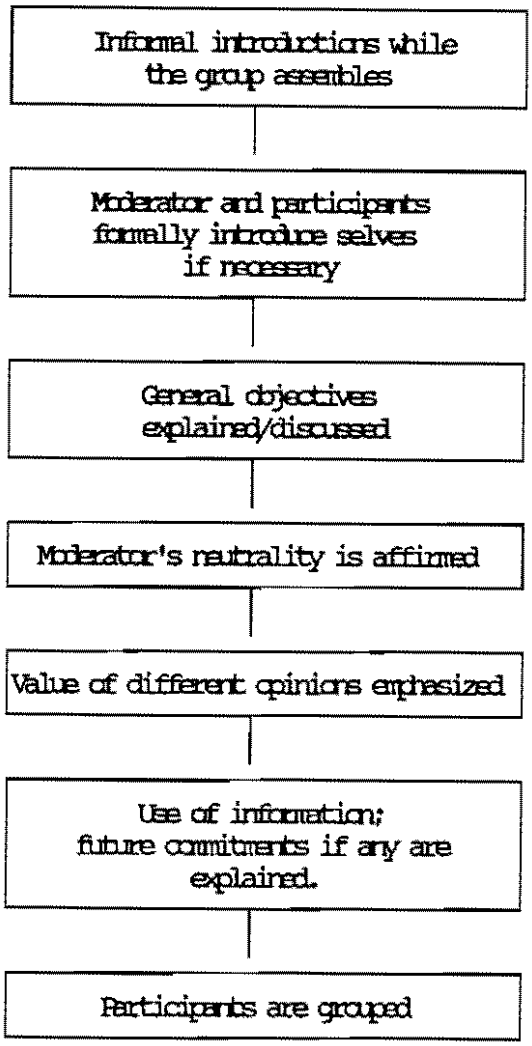


Figure 4. Flowchart of the warm-up in a Group Evaluation.

statement or summary of the objectives of the evaluation. Otherwise some or all of the participants will not know what is expected of them, and this will affect group dynamics as well as the information obtained from the evaluation.

Group discussion among farmers is often very amenable to the introduction of themes such as the problems of obtaining credit or the prices offered by middlemen, which may be very relevant to the evaluation of the technology. However, it is essential for a

group moderator to clarify from the outset, as in the process of entry for beginning evaluation research on farm, what farmers can expect to gain from participating in a group evaluation. If there are no clear expectations among the group of what the evaluation is intended to achieve, situations are more likely to arise in which farmers lobby for services which the research team is not in a position to provide. As in individual evaluations, false expectations or misunderstanding will distort information coming from the evaluation, and lead to frustration and dissatisfaction with the evaluation process for everyone.

THE IMPORTANCE OF CLARIFYING OBJECTIVES
IN A GROUP EVALUATION

A group evaluation of ten bean varieties was carried out at harvest with an extended-family labor group, whose members meet regularly on a weekly basis to work on each other's farms. All had for the first time taken part in an on-farm trial. While the bags of dry beans harvested from each treatment were being lined up for the group to evaluate, the group moderator explained that not all of the varieties could continue to be tested. It was important for everyone to select the varieties which really looked promising and discard those which did not, according to their own point of view.

The group leader, one of the older men, was overheard telling members of the group to each choose different varieties and not all select the same ones. In this way they could be sure that the researchers would leave seed of a large number of varieties behind, which the group could then go on evaluating on their own for another season.

The moderator was quietly told about this. So, before the farmers started giving their opinions, the moderator made a point of explaining that all the seed harvested of <u>all</u> the varieties would remain with the group for them to plant and continue evaluating. The moderator emphasized that a better understanding among the researchers of why the farmers in the group liked some varieties better than others would ensure that in future new varieties would be attractive to farmers.

The group of farmers then proceeded to evaluate and select three preferred varieties.

In the closure of a group evaluation the moderator summarizes in a non-judgemental way the main opinions and criteria identified by the group for evaluating the technology. Differences of opinion among farmers may be recapped to clarify them: "How important is this difference? What does this difference mean to you?". If ranking has been carried out by the group, closure is an opportunity for the moderator to go over reasons why any treatment has been ranked over another, or below others for example. As in the individual evaluation interview, committments (if any) to future contact among farmers and researchers and the use to which the information will be put are recapitulated. When several small groups have carried out an evaluation in the same session, each can present their ranking or opinions to other groups in a plenary session.

Recording and reporting group evaluations

Farmers' opinions and evaluation criteria in a group evaluation can be recorded with written notes using a form like the one shown earlier for recording individual evaluations. However, the group is "the respondent" and not each farmer: individual farmers' comments about a treatment or technology are recorded together and not on separate forms. As in individual evaluations, note-taking involves writing down as much as possible in the farmers' own words. Paraphrasing or interpretation by the interviewer is recorded in parenthesis. An unobtrusive tape recorder is a useful backup, but since evaluation often takes place in a field and there is a lot of movement of the group, transcripts are often difficult to make. In a group evaluation the moderator often cannot capture more than brief comments by participants, so the assistance of a note-taker is useful.

Essential to note-taking is the synthesis made by the moderator immediately after a group evaluation, of:

a) The main opinions expressed.
b) Differences of opinion.
c) The main criteria expressed - and a glossary of what farmer's terms for these criteria are.

In the analysis of group evaluations, it is a mistake to count the number of farmers in the group who expressed any given opinion or criteria: for example, "thirty percent of the farmers in the group said they would grow the variety again". The reason for this is that group dynamics affect who says what, and how often they speak up.

If evaluations are replicated with several groups which are representative of the potential users of the technology then each group can be treated as an observation for reporting opinions or rankings. For example, "eight out of ten groups of farmers commented that "the maize variety is too tall and crowds out the intercrop." If however, there is no consensus in a group, this result has to be reported separately: "In five out of ten groups, the farmers agreed that the threshing method was too time-consuming. However, in the other five groups, the farmers could not agree on whether the extra time required for threshing would be compensated by the larger amount of undamaged grain." Preference ranking by groups can be reported in the same way; for example, "In three of the four groups, the farmers agreed that Pokareli was the best variety because of its flavor. In the remaining group, several farmers strongly felt that Tachine should be ranked first because of its higher yield, although others said: "Although the yield is low, Pokareli is still the best because it is highly desired for its flavor."

Similarly, it is possible to do a content analysis of the frequency with which a given criterion is mentioned in different groups: for example, "In nine out of the fifteen groups, farmers agreed that early harvesting was more important than yield for ranking the best-liked variety."

The problem with counting how many times a criterion such as yield is mentioned within a group is that after commenting on the first few treatments in a trial, for example, a group may agree that yield is obviously important, and devote more commentary to other criteria, even if of less overall significance to their evaluation.

To recapitulate criteria the moderator runs checks, for example: "As we move on to look at the next hand-operated thresher, can you tell me again what you think it is important to look for here". However, this becomes tedious in group situations. Frequency counts of criteria used within a group are best used to confirm or check that the moderator's qualitative synthesis is comprehensive.

Finally it is useful to compare groups and assess what was not said. This sometimes reveals as much about farmers' priorities, as what was said. Failure to comment on some feature may give clues about group dynamics: for example, cooking quality may not be mentioned in a mixed group containing men and women, because women don't speak up about criteria unimportant to men.

Group evaluations of many optional technologies

As a general principle, group evaluations are not a reliable method for obtaining a head count in answer to a question such as "How many farmers think early planting is preferable to late planting." Group evaluations are extremely useful however, for giving research scientists a qualitative "feel" for farmers' reactions to proposed innovations. For this reason, groups are especially appropriate for exploratory evaluations at an early stage in a research project, when farmers' preferences may be relatively unknown and when researchers are proposing several alternative technological solutions to a problem. An example is a plant breeding nursery with sixty promising materials,

representing different plant types and grain types from which a smaller number must be selected for testing on-farm. Another example involves several different types of machinery for preparing maize for seed, which can be used in different combinations. Each optional combination of machines has a different labor requirement and cost structure. In another example, scientists might want to set up soil conservation trials on farm combining several different component technologies in different ways: the prototypes or components are on station, agronomic and economic evaluations indicate which are the most promising treatments, but the cost of the trials is substantial and researchers want to explore farmers' reactions before going on-farm.

In each of these examples, researchers can define subsets among the many different alternatives and evaluate each subset of options (ie. of varietal materials, or a combination of machinery, or a set of soil conservation components) with a group of farmers. Provided the groups are similar in composition, the group evaluations of the different subsets of technologies can be pooled to give an overall qualitative picture of farmers' reactions to the total set of alternatives.

For example, in the case of the plant breeders' nursery, a carefully selected group of 30 farmers, representative of potential users, is invited to evaluate the nursery of 60 materials on station. Farmers randomly separate into five groups of six farmers, each accompanied by a moderator. The nursery or trial is divided into ten blocks each of six materials. Groups are randomly assigned two blocks of six materials, in which the farmers carry out an open evaluation of each genetic material. An absolute evaluation can be carried out by each group, and each material scored as "acceptable" or "unacceptable," for example.

In practice, farmers enjoy being consulted and often want to carry on evaluating more than their assigned task. So it is also possible for the groups and moderators to exchange blocks of treatments and replicate group evaluations, until farmers are beginning to tire.

In this example, although not all sixty varietal materials are evaluated by all of the farmers, each material is evaluated by a group of farmers. Alternatively, with five subsets of materials, instead of ten, and five groups of farmers, each subset could be evaluated twice. Various combinations of the number of technology subsets and the number of farmer groups can be used to carry out this type of group evaluation.

Farmers' comments on each material are recorded by the moderators, and subsequently the group evaluations are pooled and synthesized to address questions like:

- "What did farmers comment on most?"
- "What did they like? What were positive reactions - what criteria were used?"
- "What did they dislike? What negative criteria were used?"
- "What was not mentioned or received little comment?"

Farmers' comments on each material can be analyzed to identify the significant varietal selection criteria from the farmers' point of view. This information is synthesized into a qualitative overview of farmers' reactions to all the new varieties. Absolute evaluations can be scored, especially if more than one group evaluates a subset. These scores can be interpreted along with farmers' comments, to rank treatments in order of preference.

In this way a large volume of commentary and opinion is obtained in a relatively short time. This method allows researchers to test farmers' reactions to a large number of optional technologies in an exploratory way, without requiring any one farmer to evaluate an excessive number of items.

* *

Especially when carrying out group evaluations, when much enthusiasm and consensus is generated, researchers need to bear in mind that farmers preferences cannot be interpreted to predict adoption of the technology once they use it in real-life farming conditions.

When a farmer gives an honest positive evaluation of an experimental technology, he or she is communicating a best guess that "This one is worth testing some more." By using the methods discussed in this handbook, agricultural researchers need not make that best guess on their own, but can do so in partnership with farmers, and with the knowledge that their judgement is backed up by the preferences of the eventual users of the technology.

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