PN AAR 237

PN-AAR-237
ISN-38232
986-1.07

62

Social Science Department
Training Document 1982-6

TIPS FOR PLANNING FORMAL FARM SURVEYS IN DEVELOPING COUNTRIES

Douglas Horton

INTERNATIONAL POTATO CENTER (CIP)
P.O. BOX 5969 LIMA – PERU

Tips for Planning Formal Farm Surveys in Developing Countries

Douglas Horton*

Questionnaire surveys are now an accepted tool of the trade for social scientists and others concerned with development problems in rural areas. Questionnaire surveys have been used and misused so often that a number of misunderstandings have built up around them. Some development experts consider formal surveys to be the best and perhaps the only valid way to gather information on farming systems for planning or evaluating research and production programs. Others consider surveys to be of little or no use for these purposes.

In fact, formal questionnaire surveys are one of several useful tools for gathering information on farming and rural life. Like any tool, they have strengths and weaknesses. In addition to the formal questionnaire survey, agricultural development practitioners should be familiar with a range of information-gathering tools including: literature review; study of maps, metereological data, and published statistics; informal surveys; direct field observation; and on-farm experimentation.

Some of the strengths and weaknesses of these tools are listed in Table 1. A carefully planned and executed questionnaire survey is an excellent tool for generating dependable, quantitative information on key variables in agricultural research. However, literature review and informal surveys are usually better for getting a general overview of an area's land use and farming practices. Direct field observations and on-farm trials are also indispensable for understanding many aspects of agriculture, such as incidence of pests and diseases, potential yields, and the performance of new technologies on farmers' fields.

Surveys, field observations, and on-farm experiments all have the advantage of bringing researchers into direct contact with farmers, their production systems, and their problems. Their results, however, are "time-frozen" --strongly influenced by present conditions. For this reason, when using these information-gathering tools it is important to put things into time perspective by asking questions about earlier periods, and reviewing available time series of data on, e.g., production, prices, and weather in the area.

* Agricultural Economist, CIP.

Table 1. Strengths and weaknesses of different information gathering tools for applied agricultural research

	Strengths	Weaknesses
Literature review	Helps prevent "reinventing the wheel"	Requires time and access to good libraries
Maps, meteorological data, statistal publications	Provide background data on agricultural sector	May be inaccurate or too "macro"
Informal surveys	Provide rapid overview of land use and farming practices	Allow little quantification and outsiders may consider data "soft"
Direct observation	Helps avoid problems of farmer recall, and interpretation of verbal responses	Logistical (transport) problems and small sample size
Formal surveys	Quantification and large sample size	Costly, time-consuming, and computer-intensive
On-farm experiments	Allow technologies to be tested under farmer conditions	Very costly, small sample size, require at least one full crop season logistical problems

Ideally, the research team should use a combination of these tools, and not rely on any single tool. And where possible, a sequence of research steps should be followed. It is best to begin on-farm trials after you become familiar with the area's production systems through survey work. Moreover, formal questionnaire surveys are most valuable after you have reviewed existing published information on the area (including maps and statistics) and conducted an informal survey work in the area (Rhoades 1982a).

Why Plan?

This training document presents some tips for planning formal questionnaire surveys and complements other training documents issued by CIP's Social Science Department (e.g., Rhoades 1982a, 1982b).* Planning is generally the most neglected aspect of survey research. Surveys are costly, and good planning is essential to insure that the investment made in a survey pays a high return. Doing the actual field work is often the quickest and easiest part of the entire survey process. Before and after completion of the field work come the more tedious phases of planning, data processing, analysis, and presentation of results. These phases generally require more time than the field work itself.

Due to poor planning inadequate budgeting, problems of analysis and writing, many surveys are never completed or formally presented. As a result, only a small fraction of the information recorded on farm survey questionnaires has ever been analyzed by researchers and even less has been reported in research publications.

Difficulties of field work, analysis, and presentation can be minimized through good planning. If insufficient attention is given to planning, innumerable problems which crop up during the field work and analysis are likely to inflate the cost of the survey, delay completion of the work, and raise questions as to the validity and usefulness of the information gathered.

---

* This set of documents presents a model of interdisciplinary team research and procedures for identifying, generating and monitoring appropriate agricultural technology. While the training documents are valid for a wide range of applied research situations, the procedures are especially tailored for use in agricultural research aimed at understanding and solving farmers' problems through designing and disseminating appropriate technology.

A Checklist for Planning the Survey

In planning surveys, the following 10 questions should be kept in mind:

1. Who will use the results?
2. Is a formal survey needed?
3. What should the survey accomplish?
4. What specific information should be gathered?
5. What type of survey should be used?
6. What should the questionnaire look like?
7. Who should be interviewed?
8. How should the field work be organized?
9. How should the data be analyzed?
10. How should results be presented?

The following sections address these questions. In planning a survey, it is logical to run through the questions in order, from 1 to 10. However, in practice, several questions must be addressed at the same time. For example, whether or not a survey is to be conducted depends in part upon who will use the results. Researchers' needs may be satisfied with an informal survey, but policy makers may insist on a written report with statistical results based on a questionnaire survey. What kind of questionnaire is to be used also depends on the type of survey and who is to be interviewed.

We have found it useful to plan surveys by addressing the questions in the order presented, but continually checking back (refining objectives and specifying more clearly the information needed) and also jumping ahead (making sure that all the information recorded on the survey instrument can be adequately analyzed and will meet the needs of the intended users).

1. Who will use the results?

It is a waste of resources to conduct field surveys and then fail to analyze and disseminate their results. All too often research teams go into the field with a hastily drawn up questionnaire, no clear criteria for selecting informants, and little idea of how the information recorded on survey questionnaires will be used. This is an ideal recipe for disaster.

The primary goal of this paper has been to sensitize potential surveyors to the need of thinking ahead all the way to the final use of the information obtained, and then to plan each stage of the survey so that useful results will be obtained within the framework of time and resources available. Quite often the amount of information which

is needed is far less than what researchers would like to know. Surveying is costly. Hence, planning a survey should start with a determination of who will use the information generated, and how.

2. Is a formal survey needed?

Often, when confronted with a "new" situation --geographical area or farming system-- we assume that the best way to understand it is to conduct a survey. In fact, neither the area nor the system are "new." They are just new to us. For this reason we may learn a great deal by reading publications, statistics, theses, and mimeographed reports. In addition, using key informant interviewing, "windshield surveys," and other techniques, we can gain much useful information without conducting a formal questionnaire survey.

Is a formal survey needed? This question can only be answered on the basis of our broader research goals, present information, and resources available --professional skills, funding, and time available.

The decision of whether or not to conduct a formal survey should be based on results of an informal survey conducted in the area. In many cases, especially where the time available is short and where experienced leadership for running a formal survey is not available, the best decision may be to use informal survey techniques and review literature, statistics, and maps.

Our own experience indicates that for developing a profile of farming systems in an area and/or planning on-farm trials, it is ideal to conduct informal surveys followed up by a sharply focussed formal questionnaire survey designed to quantify key aspects of the farming systems which were identified in the informal survey phase. In many cases we have moved directly from the informal survey to on-farm trials. Under no circumstances do we recommend use of formal surveys or trials in farmers' fields without a prior informal survey.

To survey or not to survey: examples

Example 1. Several years ago I was going to conduct a questionnaire survey on a large sugar-producing cooperative in northern Peru. However, after learning that seven questionnaire surveys had been done in the same area during the previous year, I decided to extract results from these studies rather than conduct my own.

Example 2. In 1979, the leaders of a farming systems team in the Philippines decided that informal survey techniques were more appropriate than formal survey techniques because several questionnaire surveys had been conducted in the same area in previous years (Potts, 1983).

Example 3. In 1980, an on-farm research team in the Machachi region of highland Ecuador decided to base on-farm trials on informal survey results rather than wait the additional year needed for conducting and analyzing a formal questionnaire survey. A formal survey was administered parallel to the first year of on-farm trials and its results were used in re-designing the second year's trials.

Example 4. In a 3-year farming systems project in the Mantaro Valley of highland Peru, a formal single-visit survey followed a study of land use and ecology (Mayer, 1979; Horton, 1984). Results of this questionnaire survey have been used in more than 10 later studies of agricultural production in the Andes, and also provided useful information for planning on-farm experiments in the area.

3. What should the survey accomplish?

Farm surveys tend to take on a life of their own. Once a survey is underway, researchers tend to forget why it is being done. One of the greatest dangers in planning a formal survey is focussing attention on preparation of the questionnaire before defining the survey's objectives. Hence, it is extremely important that the research team define both the overall project goals and the specific survey goals before working on the questionnaire per se. The objectives of the formal survey should be written down and consulted often in order to keep later stages of planning and implementation "on track."

Example. In planning a survey in the Tarma Valley of Peru, one of CIP's research teams stated as their basic survey objective: "To describe the farming system." This was too broad. After much discussion it was restated: "To identify crucial aspects of the horticultural farming system which influence farmers' decision to adopt or reject new botanical seed technology." This narrower statement of the survey's objective reflected the purpose of the survey within the team's research project.

4. What specific information should be gathered?

What do we need to learn from the survey? This depends on our research goals, the present state of knowledge, and the feasibility of obtaining information through a formal questionnaire survey. At this point it is important to keep in mind that much information which is interesting is not necessarily useful. Since gathering and analyzing information is costly, attention should be focused on gathering only information which is useful for solving the problem at hand: e.g.,

planning next year's experiments. Too often, survey teams generate a mass of general information which is never used, and as the same time fail to record information on a few key points which would have been extremely useful for planning on-farm trials.

Example. A survey in the Sabana de Bogota, Colombia was conducted to estimate the demand for certified potato seed. In this case no information was obtained on non-seed related topics. This sharp focussing of the questionnaire allowed completion of a survey of 60 producers and presentation of results to the National Potato Program in 30 days. An earlier agro-economic survey in the area required over 1 year for data processing, and final results were never presented, either verbally or orally.

5. What type of survey should be used?

Two types of formal surveys can be used: single-visit surveys and multiple-visit surveys. The single-vist survey is less expensive and its results can be analyzed and presented in a shorter time. Two disadvantages of the single-visit survey are that farmers may not accurately recall events which took place several months ago (for example, dates and rates of labor use), and the length of a single interview (around an hour) is not enough for getting detailed information on many aspects of the farming system.

The multiple-visit survey allows researchers to gather information over one or more cropping cycles and to develop a more complete picture of the farm and household economy. The multiple-visit survey is, however, much more costly than the single-visit survey and it is logistically more complex. In addition, survey results are available only after a sequence of visits is complete and a considerable amount of data is assembled, processed, and synthesized (see also Werge and Benavides, 1979).

Single and multiple visit surveys are complementary, and should be used together where possible.

Example 1. In the Mantaro Valley of highland Peru, a single-visit survey of 250 producers was conducted in late 1977. Then, a sub-set of 50 producers was visited several times during the 1977/78 production cycle to obtain detailed information on potato production technologies, costs, and benefits. In 1979, a researcher selected a sub-set from the original 250 producers for a marketing study and visited farmers 3 times: first, to update the production system information; second, to obtain information on market plans; and finally, after harvest, to observe actual market behavior (Horton, 1984).

Example 2. In the Tarma region of Peru, results of an informal survey were used to select 2 zones for more detailed study. Thirty farmers were interviewed once in each of these areas (single-visit survey), and later, three producers in each area were interviewed several times (multiple-visit survey) to obtain more complete information on horticultural production systems for use in farm budgeting analysis (Alarcón, 1983).

Example 3. After conducting a single-visit survey and initiating on-farm trials in Huancayo and Cañete (Peru), production costs and returns were studied on farms where trials were being conducted, using multiple-visit survey techniques (Werge and Benavides, 1979).

6. What should the questionnaire look like?

When people plan a questionnaire survey, they often look for a model to copy. Their goal is to find a list of questions to ask farmers. This is a mistake, since in the great majority of cases the survey schedule should be prepared from scratch to meet the specific needs of the research project.

Six rules of thumb can be given for preparing good questionnaires.

a. Distinguish between researchers' questions and questions for farmers. In preparing the questionnaire, include only questions which farmers can answer. These answers are then used by researchers in answering the broader research questions.

Example. In one field study, an important question for the research team was: "Why did farmers begin producing potatoes for market 10 years ago?" When farmers were asked this question, their responses ranged from, "Because that is when I began farming," to, "Because my family always grew potatoes." In fact, commercial potato production began when a road was constructed into the area, greatly reducing transport costs to market. This illustrates the point that while farmers can provide researchers with a vast amount of information about their production practices and household economy, the information which researchers look for and their use of data depend upon their own analytical framework.

b. Be specific and concrete, not general and vague. Be specific and to the point with a questionnaire, because vague questions elicit vague responses which are difficult or impossible to interpret. General, open-ended questions are usually the first ones which come to mind, but these must be thought through and carefully re-phrased if they are to elicit useful information.

Example. In the first draft of one questionnaire, we asked, "What are your principal crops." In reviewing the question, we realized three problems. First, the term "principal" was ambiguous; one crop could be "principal" in terms of planted area, another in terms of quantity harvested, and yet others in terms of gross income, net income, or employment absorption. Second, while our research interest was in the irrigated, vegetable-producing area, many producers had crops in both rainfed and irrigated areas; our question did not distinguish between the two. Third, given the highly dynamic market environment of the area, this year's "principal crop" might not be last year's. After lengthy discussions, we replaced the initial question with three:

- "In 1981, what were your principal crops in terms of total value of production (include only those planted in the lower irrigated part of the valley)"

- "Do you also have land parcels in the high zone?"

- "In 1981, what were your principal crops in terms of total value of production planted in the high zone?"

c. Use boxes or tables, not questions. Questions written on interview schedules should generally not be read to farmers by interviewers. Instead, they should serve to remind interviewers what specific information is to be obtained. Obtaining this information might require background explanation and several questions rather than one.

We have also found it useful to provide space in boxes on the interview schedule for noting down information, rather than listing a long series of questions. To use this approach, interviewer must know what information is to be obtained and how it is to be used. This in-depth knowledge can best come from involvement of the interviewers in the preparation of the questionnaire. If this is not possible, careful training, pre-testing, and modifications in the questionnaire are necessary to ensure that all interviewers will use the same criteria in filling them out.

Example. A single general question can be reformulated as a table for noting down specific and detailed information. In the first draft of a questionnaire the following questions appeared: "How do you finance your production costs?" From:

own resources _____
credit from the Agrarian Bank _____
merchants _____
other sources _____

In the final version the question was replaced with a table:

Use of Credit

(check appropriate boxes)

Crop	Agrarian Bank	Other Banks	Merchants	Others (specify)
1.				
2.				
3.				
4.				

Note that space was left for 4 crops; information was gathered on these same 4 crops in all other sections of the questionnaire.

d. Use local terminology and logic. In developing a questionnaire, use local terminology and list the questions or areas of interest in a logical sequence. Useful local terms should be noted during informal surveys, and international equivalents for local units of measurement (e.g., for time, weight, volume, and distance) should be established. These terms and units should then be used in the questionnaire.

> Example. In areas where land is commonly measured in manzanas (parts of Guatemala) or in topos or in yugadas (Peru) these units, rather than acres or hectares, were used in the questionnaire survey. Similarly, where potato production is measured in sacks or cans, these units, rather than kilograms or tons, were used. During the informal surveys, equivalents between the local units and conventional metric units were established which permitted conversion of all data into metric units during processing of the survey results.

e. Pre-test and pre-code. When the research team feels the questionnaire is in reasonably final form, they should pre-test it in two stages: first, members of the research team should test the questionnaire on each other or on friends, to see whether or not the questions elicit reasonable responses. When the questionnaire passes this initial test, it should then be tested on a few producers in the study

area for fine tuning. It is also useful to "pre-code" the questionnaire prior to conducting the survey. This allows the research team to see precisely how information will be processed and if results provide answers to the key questions. Pre-coding also helps standardize the criteria to be used by interviewers when they formulate questions to farmers.

> Example. In a Peruvian survey, pre-coding the questionnaire helped clarify which questions required yes/no answers and which required quantitative estimates. This helped simplify the questionnaire, minimize errors and inconsistencies in field work, and simplify data coding and processing. As a result of good planning, in only 2 weeks the five members of the survey team interviewed 70 producers and coded all information on the questionnaires.

f. Be brief. The final point on preparing the questionnaire is to minimize the time required for the interview. Farmers are busy people who often become bored answering questionnaire surveys, especially poorly planned ones read by poorly trained interviewers who know little about its subject matter.

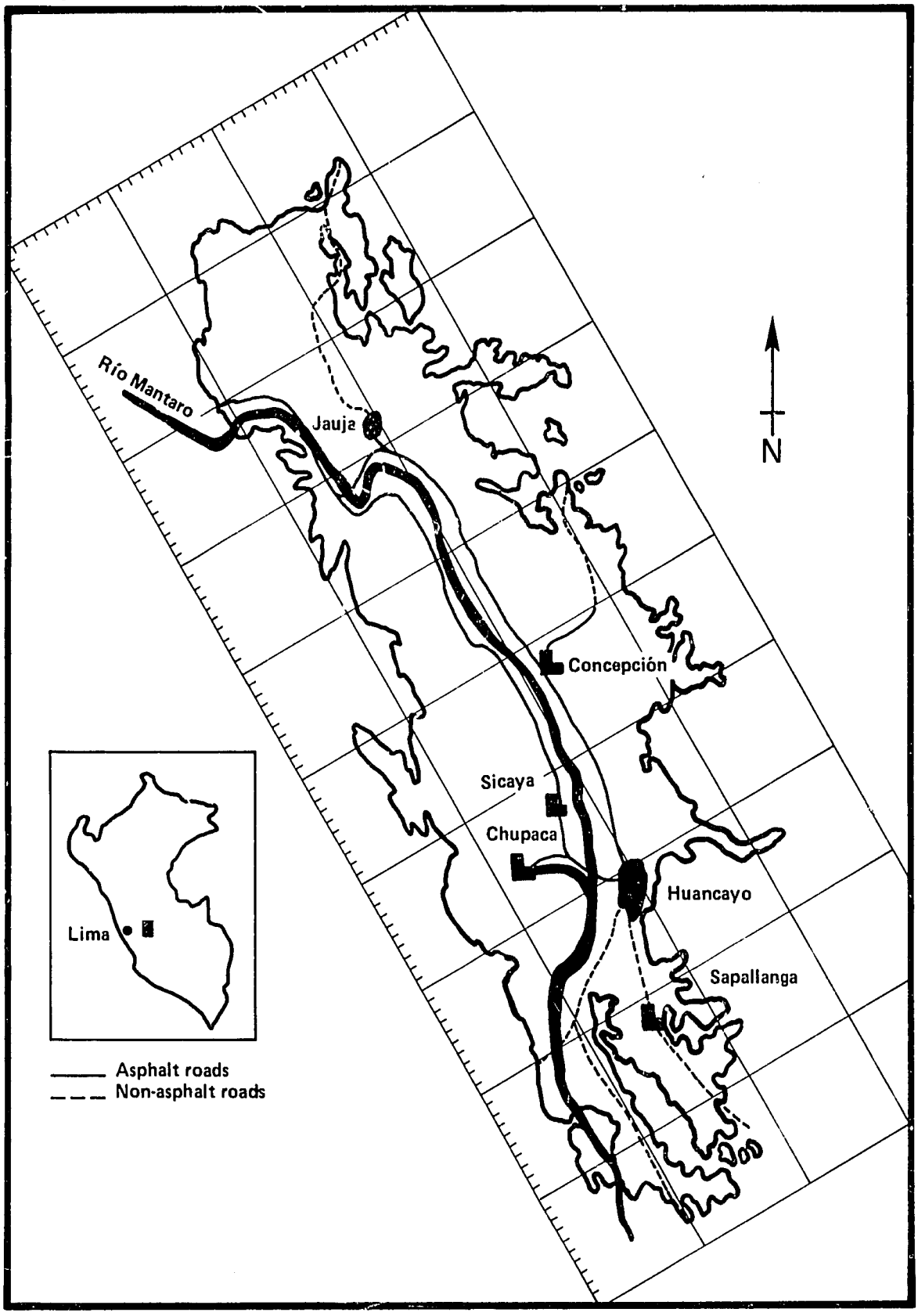
7. Who should be interviewed?

More has been written about the theory of sampling than about practical aspects of selecting a sample of farmers for a survey. Where feasible an attempt should be made to randomize the selection of informants, this minimizes biases introduced by interviewing more accessible or better-known farmers, who are not representative of the majority. However the ideal of random sampling is seldom achievable.

The first problem in selecting a random sample of informants is to define the study's "universe." If the project is directed toward seed potato growers, then the universe of informants may be those appearing on the Ministry of Agriculture's official list of seed producers. If, on the other hand, the project addresses the needs of horticulturalists, then the universe may be those farmers in irrigated areas presently growing vegetables. Ideally, a list can be made of the universe of potential informants, and from this list a sample can be randomly drawn. We used this technique with success in one small, well defined area where village authorities could name the operators of all farm fields.

In most cases we have not found it possible to obtain complete lists of producers in the study universe. For this reason, we usually use another sampling technique known as "area sampling." As shown in Map 1, in the Mantaro Valley of highland Peru a grid was drawn over a map of the study area, each space on the grid was assigned a number, and randomly selected points were located on this grid. The survey

Map 1


Río Mantaro
Jauja
N
Concepción
Sicaya
Chupaca
Huancayo
Sapallanga
Lima
Asphalt roads
Non-asphalt roads

team then attempted to locate the operator of the field under the point (Franco, et al., 1979).

In the case of sampling from a list of producers, survey results can be extrapolated to the entire area directly. But where area sampling is used, a weighting formula must be applied in extrapolating results. This results from the fact that the probability of a point's falling on a farm is directly proportional to the size of the farm. Hence, area sampling biases results in favor of the larger producers. Procedures for weighting an area sampling are presented in Alarcón and Rubio (1982).

The sample size should be determined on the basis of two considerations: (1) degree of variability within the area and (2) budget available for the study. In a large area with a great deal of variation in soil, rainfall, irrigation and farm types, an attempt should be made to define agro-ecological zones with a reasonable degree of internal uniformity. Ideally, 25-30 interviews will then be made in each zone. In smaller areas, or where ecological conditions and farming systems are less variable, fewer interviews may suffice.

8. How should the field work be organized?

Good planning and organization can minimize the hardships of field work. Nevertheless, in general, farm surveys are physically demanding. For this reason it is important to maintain a strong team spirit during the survey. Transportation is critical, and requires an adequate budget. Interviewers should be familiar with the survey objectives and with criteria for selecting informants and filling out questionnaires. Adequate per-diem, transport and essential supplies (including such things as raincoats and boots in rainy areas) help keep morale up and allow the survey team to function under difficult circumstances. Daily schedules should be flexible so that interviews can be arranged with farmers at times and places which are convenient to them --this may be early in the morning, late in the evening, or at mid-day in isolated fields.

For obvious reasons, we have found it easier to maintain the necessary staff morale and logistical support for quick (two-three weeks) single-visit surveys than for the multiple-visit surveys.

9. How should the data be analyzed?

If the results of a survey are to be used in future stages of a research or development project, it is important that they be made available quickly. Two data processing methods are available: manual and computerized. Tabulation of the data by hand and processing with

simple calculators is often the quickest and most effective means of processing survey data. However, it does not permit complex cross tabulations or other sophisticated analyses, and it is not generally feasible for processing large surveys. Use of computers, on the other hand, generally implies a longer start-up time, to create and check data set and prepare programs for special analyses, but has the advantage of allowing more complex analysis of larger data sets.

Where the survey team has direct access to mini-computers and adequate software, computerized processing is the logical course. This is rapidly becoming the case. But where researchers do not have experience with computer processing and direct access to the computer facilities, manual processing may still be more appropriate for small surveys.

Example 1. A single-visit survey was conducted in the Carchi region of northern Ecuador. The Ecuadorian research team did not have access to computer facilities, so information was sent to CIP for processing. Considerable difficulties arose in interpreting information on the questionnaires, and processing was slow. After several months, in order to make essential information available for planning the coming season's on-farm trials, we decided to return the questionnaires to Ecuador for hand processing by the original survey team. In a few weeks basic statistics on varieties grown, seed rates, yields, fertilization levels, and major pest and disease problems were generated.

Example 2. In the Colombian survey mentioned earlier (Section 4) the basic results of the survey were presented only 15 days after fieldwork was completed. All data processing and analysis were done using hand calculators.

10. How should results be presented?

Survey results can be presented in many ways, ranging from sophisticated scientific publications to straight-forward presentation of results using a minimum of professional jargon. We have found that the best type of survey report for applied agricultural research is organized around the objectives of the survey. It begins with an introductory section placing the survey within the context of the larger research or development project, and then follows with brief sections outlining the procedures used and principal results obtained. Simple tables are included in the text to illustrate major findings. More detailed tables presenting more general findings and useful background information are placed in appendices at the end of the report.

We have also found it useful to prepare two reports at the end of a survey: an "initial" survey report which is written immediately

after the field work, and a "final" report which is prepared the data processing. The first report is useful for capturing impressions and insights of the research team which may be forgotten during the quantitative data processing. In many cases, these observations are helpful for interpreting quantitative survey results, and vice versa. In addition, this first report should contain a critical evaluation of the effectiveness of the questionnaire and survey implementation.

> Example. The initial survey report prepared by a research team evaluating the feasibility of introducing true potato seed in a highland area of Peru indicated that farmers did not understand certain questions concerning the advantages and disadvantages of using seed beds in horticultural crop production. In addition, the report noted that an important horticultural area within the region had not been covered by the formal survey, and concluded that in future studies more emphasis should be placed on informal, exploratory surveys, in order to better define areas and topics for in-depth study, and terminology to be used on questionnaires.

The final survey report should be tailored to meet the needs of its users. In cases where the same research team conducts both the survey and later project activities, such as on-farm trials, an extensive survey report may not be needed. Nevertheless, it is useful for the team to write a survey report for four reasons: (a) the discipline of data processing and writing helps clarify survey findings; (b) results will be useful for planning and interpreting results of the trials; (c) survey results will also be useful for later evaluation of the entire applied research effort; and (d) survey results can make a useful contribution to the small published literature on farming systems in developing countries.

In many cases an important function of the survey is to communicate to other researchers new information on farming systems in the area. In these cases, the survey report should address major questions, assumptions, or beliefs of these groups.

> Example. Many potato researchers believe that small, highland Peruvian farmers use traditional varieties, low levels of fertilization and pesticides, and traditional tillage practices because they do not know about recommended, improved practices. During the Mantaro Valley surveys, it became apparent that small farmers were well informed about recommended practices, but did not adopt many of them which were no better than their own practices, in economic terms. For this reason, our survey reports stressed the rationality of small farmers' practices and how careful research was needed to identify areas where improvements could be made in potato production. We discouraged promotion of complex technological packages which were not likely to meet the needs of most farmers.

Conclusions

The purpose of this training document has been to present some basic tips for planning formal farm surveys in developing countries. The formal survey is a powerful tool important in gathering information from farmers in order to arrive at wise decisions in the implementation of agricultural development projects. However, the formal survey must be used with common sense and a dedication to clear focus by gathering only useful data. The temptation to construct long, awkward questionnaires involving interesting but essentially irrelevant questions must be avoided.

To guide development workers ten basic questions related to the formal survey should be seriously asked. They range from "Who will use the results?" to "How should the results be presented?." Above all, however, we should demand that the survey yields information that will help us solve farmers' problems. Farmers have been "administered" questionnaires for centuries by governments and scientists (e.g. the first survey in the Mantaro Valley was a complete household survey by Spanish conquistadores in the early 16th Century).

Understandably their patience with us in many world areas is running thin. For these and other reasons, we need survey questionnaires that are sharply focussed, relatively short, inexpensive, but get the job done. This training document and its ten basic questions help us accomplish these important goals.

Additional Reading

Alarcón, J. 1983. Introducción de Semilla Botánica de Papa en un Sistema de Producción Hortícola: Análisis Prospectivo en la Región de Tarma, Perú. M.S. Thesis. Universidad Nacional Agraria La Molina, Lima, Peru. 238 p.

Alarcón, J. and A. Rubio. 1982. Un Método Estadístico de Selección y Evaluación de Muestras para Encuestas Agrícolas. Con Aplicación a Productores de Papa en el Valle de Cañete, Perú. Documento de Trabajo 1982-2. CIP: Lima, Perú. 23 p.

Franco, E. et al. 1979. Producción y Utilización de la Papa en el Valle del Mantaro - Perú. Documento de Trabajo 1979-1. CIP: Lima, Peru. 121 p.

Horton, D. 1984. Social Scientists in Agricultural Research: Lessons from the Mantaro Valley Project, Peru. IDRC: Ottawa, Ont. 67 p.

Mayer, E. 1979. Land-Use in the Andes: Ecology and Agriculture in the Mantaro Valley of Peru with Special Reference to Potatoes. CIP: Lima, Peru. 115 p.

Potts, M. (ed.) 1983. On-Farm Potato Research in the Philippines. The International Potato Center. 169 p.

Rhoades, R.E. 1982a. The Art of the Informal Agricultural Survey. Training Document 1982-2. CIP: Lima, Peru. 40 p.

Rhoades, R.E. 1982b. Understanding Small Farmers: Sociocultural Perspectives on Experimental Farm Trials. Training Document 1982-3. CIP: Lima, Peru. 9 p.

Werge, R. and M. Benavides. 1979. Investigation of Farming in Peru by Means of a Multiple-Visit Survey. Working Paper 2. CIP: Lima, Peru. 14 p.