Chapter 4 Data collection

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Data collection in on-farm research aims at the collection of those data which are considered necessary to solve a particular research problem. It is not done in order to establish a broad data bank.

Data can be collected for **different purposes**:

- for **exploratory purposes**, e.g. as a basis for:
  - a **description** of farming systems and practices,
  - **formulating hypotheses, theories and research questions** with regard to agricultural problems and potentials, or
  - **getting first ideas with regard to farmers' assessment** of potential innovations;
- for **confirmatory purposes**, as a basis for the **validation** of hypotheses and theories, or to answer a research question.

Data are differentiated according to their origin:
- **primary data** are new, genuine data generated in the course of the research;
- **secondary data** are already existing.

The following chapter will first describe some basic methods of data collection: secondary data collection, and primary data collection in non-standardized and standardized interviews, group discussions, the panel and observation and measurement. Each of these basic methods has its merits and its limitations. They are, therefore, hardly ever applied on their own. Nevertheless it is important to know their principles and characteristics in order to understand how each of them can be most appropriately applied in combination with other methods. Details as to their implementation are given in connection with the most common combinations applied in on-farm research, i.e. the exploratory survey (4.2.1), the dialogue on innovation (4.2.2) and the formal survey (4.2.3).

The experiment, which is explained at length in Chapter 4.3 is strictly speaking not a data collection method, but an important basis for the collection of data at several stages of the research process.

4.1 Basic methods of data collection

4.1.1 Secondary data collection

Secondary data collection deals with the gathering of already existing information. Appropriate utilization of this kind of information will ease the access to a research problem and economize the research process.

Purpose and application

Secondary data collection is useful at almost all stages of the on-farm research process:
- During the **exploration of demand** secondary data are the basic source of information on physical and socioeconomic conditions in the project area. They help to define preliminary target groups. They are the basis for the formulation of a first hypothesis on the need for innovation which is subsequently validated in field work. Where necessary, they are the basis for the selection of areas and farmers for primary data collection.
- Secondary data are the essential basis for the screening process in the identification of options for experimentation.
- Secondary data are important in many instances for the **assessment of options**. Long term rainfall data for example, have an important bearing on the suitability of a technology to the local environment; secondary data on market structures and prices are usually the basis for assessing economic viability ,etc.

Data sources

Various sources of information may be tapped. These can include maps, rainfall records, reports by government services, research stations, development projects, universities or NGO's. Written documents may be supplemented by verbal information from dealers, marketing organizations, extension agents, local leaders, missionaries, etc.

It should be kept in mind, however, that the aim is not to collect, but to utilize information. It is wise to carefully consider which information is worth considering at each stage of the research. A lot of information may be interesting but only some of it really useful.

4.1.2 Primary data collection

4.1.2.1 Interview

The interview is a type of data collection where people are asked to express their opinion on the subject to be studied. There are two types of interviews:
- the **non-standardized** interview and
- the **standardized** interview.

Characteristics

In **the non-standardized interview** the interviewer is only guided by a list of topics. The interviews are unstructured, informal conversations with emphasis on dialogue. The non-standardized interview allows a flexible reaction to the interview situation. Formulation of questions and their order is determined by the interviewer during the interview. The interviewer is free to dig deeper where it appears necessary and to add to the list of topics where it seems to be appropriate.

In the **standardized interview** the interviewer is working with a fixed questionnaire. Formulation of questions and their order is determined by the questionnaire. The questionnaire is presented to all interviewees in the same way. It is not supposed to be modified by the interviewer.

The relatively flexible **non-standardized interview** is considered the more suitable tool in the **context of discovery** (Phillips, 1968). It is useful for descriptive – explorative purposes (Hopf, 1991). The non-standardized interview is commonly considered an appropriate method for exploratory data collection to get first ideas in a field of work which is still fairly unknown to the researcher (Friedrichs, 1983). It is a good basis for the formulation of theories or hypotheses. The flexibility of the interviewer to adapt to the specific individuality of the interviewee also permits him/her to address sensitive issues (Berekoven e.a., 1989).

The **standardized interview** is more advantageous in the **context of validation** (Phillips, 1970). The use of a fixed questionnaire limits the range of topics that can be addressed. The formulation of the questionnaire therefore requires a previous good knowledge of the subject to be studied (Mangold, 1969) and a hypothesis or theory which is to be validated (Friedrichs, 1983). Standardization facilitates quantification and allows results to be reproduced and compared. The standardized interview has a particular

value as evidence, but it is less likely to generate "surprising information" or new ideas (Mangold, 1969). It is, therefore, considered the more appropriate tool for the collection of confirmatory data to prove the validity of theories or hypotheses or to answer specific research questions.

Application

The **non-standardized interview** is commonly applied in on-farm research for exploratory purposes. It is used in particular
- during the exploration of demand in **exploratory surveys**, to
  - get some ideas about farming systems and practices;
  - gather information about farmers' circumstances, goals and preferences;
  - formulate first hypotheses on how circumstances, goals and preferences determine farming systems and practices;
- for the identification of alternatives for experimentation in a **dialogue on innovation**, to
  - explore which criteria a new technology needs to satisfy farmers;
  - identify promising options from a set of available alternatives;
- for the assessment of technologies in a **dialogue on innovation**, to
  - gain information as to how far trial options correspond with farmers goals and preferences.

The **standardized interview** is less commonly applied at present in rural development projects, but it is a useful tool for the collection of data of a confirmatory nature. It is the basic tool of **formal surveys** and is applied, for example,
- in the final assessment of a technology to examine the degree of adoption or nature and extent of modifications by farmers;
- sometimes in the exploration of demand to verify a hypothesis which determines the direction of the subsequent research, if the validity of the hypothesis is not beyond doubt after informal data collection.

Problems of the interview situation

The interview situation causes a number of difficulties which influence the validity of the information obtained.

The extreme artificiality of the situation and the formality of an interview can result in an artificial reaction of the interviewee and in superficial answers. This is in particular the case in a formal interview situation.

Answers given are more often than not determined by social norms or of what the interviewee assumes to be the expectation of the interviewer rather than by the interviewee's own opinion. In the latter respect information obtained in an interview is biased in particular if the interviewee assigns the interviewer to a specific institution, ethnic group, social class etc. For example answers given with regard to agricultural questions are frequently guided by known extension recommendations rather than by a genuine opinion if the interviewer is identified as a member of an agricultural institution.

The information obtained is also influenced by the fact that the answers given in an interview are determined by the facts and goals the interviewee is immediately conscious of (very often one is not immediately conscious of everyday matters). The information given by an interviewee can furthermore reach only as far as his personal knowledge and experience (someone who does not know electric light will hence not be able to give a good description or assessment of it).

4.1.2.2 Group discussion

The group discussion is a specific type of **non-standardized** interview in which a specially arranged **group of people** discusses a particular subject under the guidance of the researcher or another person not belonging to the group.

Characteristics

The group discussion has many characteristics in common with the individual non-standardized interview: it is of an explorative nature, hence a tool to gain first or new idas about a topic. It hardly permits quantification of information and is, therefore, unsuitable as evidence.

The situation of the group discussion is, however, usually considered less artificial by the participants than the individual interview.

Inhibitions of the participants are often reduced in the course of the group discussion as the participants stimulate each other to express their views. One group discussion reveals usually more information than a number of individual interviews.

The group discussion can stimulate the opinion-formation process on subject, whereas the individual interview is dealing with already formed views. The opinion eventually expressed by the group does not really reveal individual opinions, because opinion formation is to a considerable extent determined by group dynamics. The group discussion does, therefore, not assist in the quantification of individual opinions. Rather it provides insights into the **criteria and motives** determining the formation of an opinion and is an important tool for exploratory purposes in this respect.

Group discussions are not appropriate for socially sensitive issues (like income or food availability) and may produce misleading impressions if they are dominated by individuals.

Application

The group discussion is a useful tool during the **exploration of demand** to get the **exploratory survey** started off. It can provide a quick overview of farming systems and how they are determined by farmers' circumstances, goals and preferences. Thisis a good basis for the formulation of a topic guide for subsequent individual interviews.

The group discussion is also a valuable tool for a **dialogue on innovation** at all stages of the research process.

Importance of group composition

Interaction of farmers in a group discussion depends to a large extent on the composition of the group.

Heterogeneity in group composition can sometime be useful in obtaining a good cross section of opinion. The handling of heterogeneously composed groups requires, however, considerable moderator skills. Discussion within heterogeneous groups often provide invalid results because they are dominated by individuals or by members of specific social groups. In a village meeting or any other heterogeneously composed group for example, it is very likely that the discussion is dominated by men or by community leaders whereas women or community members with a lower social status remain silent.

Some **homogeneity** with regard to criteria like gender, social status, interest and experience with the subject to be discussed will usually be of advantage for group interaction. It can be helpful, therefore, to split up heterogeneously composed groups according to suitable criteria after some initial discussion.

Homogeneity can also be achieved if farmers are specifically selected for the purpose of a group discussion according to predefined criteria. In this case, a cross section of opinion requires the careful definition of all relevant groups of farmers and their separate involvement in group discussions.

Group interaction may be relatively easy in already existing groups of farmers. However, care is required as these groups are often not composed representatively for the purpose of the group discussion.

It is not an easy task for the researcher to achieve an appropriate group composition. Some criteria given in Chapter 6.1.3 (target grouping) may be useful in this respect. It is further recommended that local informants be involved in the definition of appropriate grouping criteria and the selection of suitable farmers for group discussions.

4.1.2.3 Panel method

The panel method is a specific interview method where the **same people** are **involved repeatedly** over a period of time. Such repetition is applicable to individual interviews as well as to group discussion. The basic principles described thered also apply to the panel method.

The panel method is common in opinion as well as in marketing research. With some modification it appears to be a very useful tool for on-farm research.

Characteristics

In the panel method **the same farmers participate** in discussions repeatedly on a research topic several times, idealy right from the beginning (the exploration of demand) up to the end of the development of an innovation (the final assessment). This gives farmers the chance to get familiar with the general concept of the research as well as with the specific topic, thus placing them in a position to effectively contribute to the research process.

Repeated contacts between researchers and farmers contributes towards building up necessary **mutual confidence**. The result is decreasing inhibitions on the part of farmers to express themselves and a more open and honest dialogue.

An appropriate expression of an opinion further requires that the **formation of an opinion** is fairly advanced on the one hand and that the interviewee is conscious of it, on the other . In particular with regard to the latter, the interviewee is often not aware of the reasons for his opinion if he is taken by surprise in a single interview. An opinion on a subject new to the interviewee requires time to develop. The formation process is usually not finished when, for example, a farmer is asked to assess a new technology

once after a trial season. Using the panel method, a more long-term dialogue on a subject helps the interviewee both to form an opinion and to become conscious of already developed ones.

One problem with the panel **technique may be the so-called panel death**: with time participants loose interest and need to be replaced, or panel groups may completely dissolve. An interesting and diverse selection of topics for panel discussions can avoid panel death to some extent.

It can be hardly avoided, however, that the **consciousness** of participants slowly changes with continuous participation in a panel. A change of participants after some years is, therefore, inevitable if representative views are to be gained from participants.

Application

With a careful selection of participants and a good selection of topics, the panel may be the **most appropriate tool for the dialogue on innovation.**

The same participants are used for discussions throughout the research process:

- in the **exploration of demand** to develop an inventory, to set priorities, or to validate researchers' hypotheses regarding demand;
- for **identifying options**, to draw up lists of criteria innovations need to satisfy in order to comply with farmers' criteria, or to select potential options from a set of available alternatives
- to **assess experimental treatments** in the course of experimentation.

Panel groups are applicable at all stages of the research process. Individual discussions are useful for the assessment of options with the participants of the experimental phase if a quantification of opinion is desired.

4.1.2.4 Observation and measurement

Observation and measurement is data collection based on visual examination or instrumental measurement.

Characteristics

Whereas the value of an interview depends to a large extent on the quality of the answer given, the value of observations and measurements only depends on their skillful and careful implementation.

Objective results are achieved through measuring, counting and weighing. Observing (for example the degree of pest infestation) is subject to the interpretation of the observer. Results can, therefore, be of a subjective nature. Strictly speaking, for results to be comparable, all observations on a specific matter should be conducted by the same person. Comparable results by different observers require sufficient practical training in order to achieve a good level of correspondence.

Application

Observations and measurements are the tool for the collection of **agronomic data in experiments**. Here they prove the relationship of the experimental treatments applied with yield and quality characteristics under given environmental conditions (see Chapter 5 "Experimentation" for further details).

Observations and measurements are furthermore an important tool to **supplement information obtained in interviews**. They are applied in informal (for the exploration of demand) as well as in formal surveys (for the assessment of technology). On the one hand, observing and measuring allows the researcher to grasp certain information faster and more precisely than is possible in an interview (for example, information on cropping patterns, spatial arrangements etc). On the other hand it can be used to validate verbal information obtained in an interview (for example to avoid incorrect results with regard to adoption or non-adoption of a potential innovation).

4.2 Application of data collection in on-farm research

4.2.1 Exploratory farming systems survey

The exploratory farming systems survey is useful as the **first step in the on-farm research process**. Basic data collection methods like secondary data collection, non-standardized interviews, group discussions and field observations are combined in order to get preliminary information about farming systems in a specific area.

Such a survey is often omitted because the procedures appear to be too difficult and time consuming and there is the understandable desire to achieve trial results as fast as possible. Where the exploratory survey is carried out, it is often the one-man-show of an economist and, hence, agronomically relatively superficial. Consequently it is rarely used as a basis for the planning of experiments.

The following chapter attempts to describe an approach to the exploratory farming systems survey which is simple enough for implementation in rural development projects and yet sufficient as a basis for the planning of trial programmes.

4.2.1.1 Objectives and purposes

The exploratory farming systems survey is implemented as the first step of the on-farm research process. It is undertaken in order to

- gain some understanding of the local farming systems;
- study the effects of natural and socio-economic circumstances on the development of farming systems;
- assess motives and decision criteria which influence farmers decisions;
- create an information basis for the identification of problems and potentials and for the definition of different "target groups" or "recommendation domains".

On the basis of this information the researcher will be able to formulate a **first hypothesis** on the existing demand for innovation.

A shortcut farming systems diagnosis can also serve as a means to get new research staff of a project fast and easily acquainted with the situation of farmers and is recommended after changes of key personnel even if the diagnosis was done already.

The exploratory farming systems survey as it will be described in the following section will permit only an incomplete assessment of farming systems and determining conditions. It will be the basis for the **researchers' perception** of farming systems, determining factors and systems constraints. The picture gained should not be assumed to be the truth. "What researchers believe the farmer thinks or needs is not necessarily what the farmer actually thinks or needs" (Ashby, 1990). The hypotheses on demand for innovation should therefore be validated in an intensive dialogue on innovation between farmers and researchers.

4.2.1.2 Characteristics

Different terms are used for this activity, including *informal, diagnostic or reconnaissance survey, rapid rural appraisal or diagnosis and design*. Despite differences concerning the methods applied, all have in common that

- the survey is conducted by an interdisciplinary team;
- the data collected are more of a qualitative nature;
- non-standardized, largely unstructured interviews are combined with observations;
- direct farmer – researcher interaction is conducive to the collection of information concerning farmers' goals, opinions values and knowledge;
- results are achieved rapidly and cost efficiently.

The exploratory survey is executed **before** the on-farm experimentation programme is designed. It helps to avoid a wrong direction of the experimentation programme.

Farming systems are determined by a variety of circumstances. The farming systems survey must therefore take an **interdisciplinary approach** in order to thoroughly understand all relevant factors. The danger of a single-sided approach is that important aspects are overlooked or omitted.

Consequences of **late, single sided or insufficient diagnostic work** at the beginning of a programme are often discovered only after years of programme implementation. Time and funds gained by initiating experimentation before a sufficient diagnosis was made may result in the utilization of scarce project resources for the development of technological components which eventually prove to be inappropriate.

The researcher has to be aware of **possible inaccuracies** in the information obtained caused by the informal character of the survey. Depending on sampling procedures the group of farmers interviewed may not be representative. Furthermore it will not be possible to generalize information obtained across all farmers interviewed, because the questioning is not standardized (FSSP, 1985).

The results of every step of the work should be sufficiently **documented**. Written documentation is helpful for the research team to get a common understanding of ideas and conclusions. Moreover it is an essential tool in explaining the logic of the subsequent programme design to observers and, more importantly, successors in the project. Often projects undergo drastic changes with a change of personnel because the logic of the predecessors is not clear to the successors.

4.2.1.3 Contents of the farming systems survey

The circumstances and goals of farmers determine present farming systems and production technologies as well as farmer's decisions concerning changes of technology. The farming systems diagnosis should therefore aim to understand of farming systems and practices in the light of farmer's circumstances and goals. It will not be sufficient to know the crops grown or the livestock kept and the agricultural practices applied. A reasonable understanding of natural and socio-economic circumstances as well as farmer's goals and priorities improves the chances that subsequently proposed changes of technology do not conflict with these factors.

The **"historical development"** of cropping or farming systems deserves special attention in the survey contents. Recent developments, resulting in todays situation, are an excellent indicator of the demand for innovation perceived by farmers and for farmers own strategies to satisfy this demand.

A rough outline of the essential points in a farming systems diagnosis is given in Table 4.1. Details with regard to significance, utilization and analysis of information gained during the diagnostic phase are given in Chapter 6.1, analysis of information from non-standardized data collection.

For the exploratory survey it is helpful to outline the interview contents in a **"topic guide"** after information gaps were identified in the analysis of background information. During the field implementation the topic guide is upgraded in daily roundup sessions (see survey procedures). A sample guide is presented in Annex 4.1.

Table 4.1: Suggested contents of the exploratory survey

1.	Farmers circumstances
1.1	Physical / infrastructural situations
1.2	Socio – economic institutional, economic, social and cultural, role of women
1.3	Natural conditions climate, land, soil and water
2.	Farming systems
2.1	Cropping pattern and land use
2.2	Production methods
2.3	Inputs and yields
2.4	Crop disorders
2.5	Post-harvest aspects
2.6	Livestock
2.7	Integration of crop and livestock production
2.8	"Historical development"of farming/croppg.systems and innovations already developed by farmers

4.2.1.4 Process and procedures

The exploratory farming systems survey consists ideally of the following methodological elements:

(1) secondary data collection and analysis;
(2) "field work" with:

- non-standardized interviews with key informants;
- non-standardized interviews with farmers;
- group discussions;
- field observations.

A possible procedure for the execution of the exploratory survey is given in Figure 4.1. Expected outputs of the elements are summarized in Table 4.2.

Figure 4.1: Suggested procedure for the exploratory survey

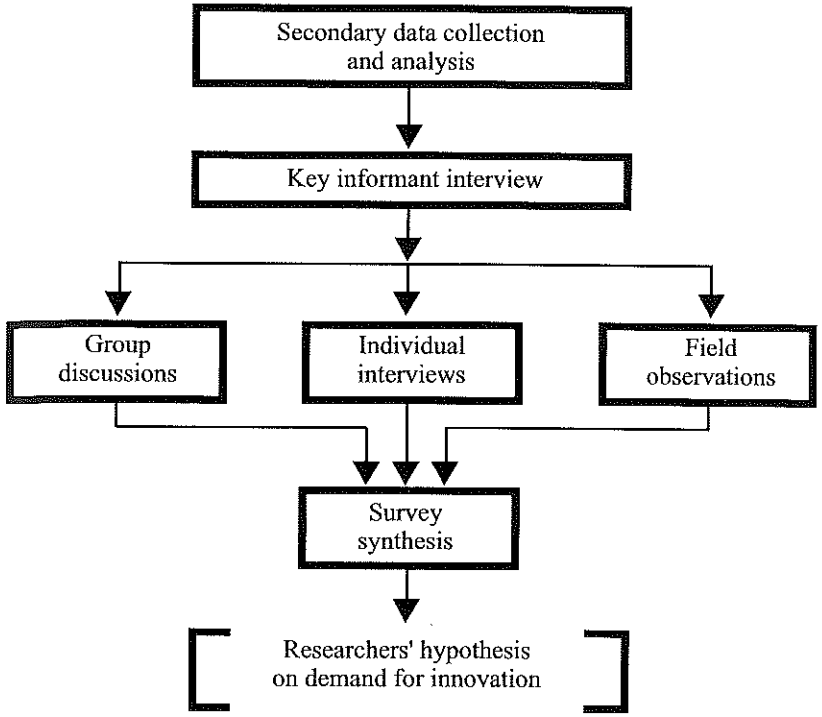

Table 4.2: Steps of the farming systems diagnosis and expected outputs

Steps of the diagnosis	Expected outputs
(1) Analysis of secondary information	– existing information summarized; – information gaps identified; – first hypothesis regarding target group definition and demand for innovations formulated ; – survey villages selected; – topic guide prepared.
(2) Field work	– farmers interviewed; – field observations executed; – topic guide updated daily ; – information on farming systems and practices, farmer circumstances and goals collected and recorded.
(3) Survey synthesis	– agro-ecological zones defined; – zones of similar socio-economic circumstances determined; – hypothesis on target groups / recommendation domains formulated; – inventory on demand for innovation elaborated and priorities set; – potential options to satisfy demand identified.
(5) Evaluation of diagnosis with farmers	– results of farming systems diagnosis evaluated with farmers.

4.2.1.5 Analysis of background information

The analysis of background information (also referred to as base data or secondary information) should help to

- summarize existing information on the physical and socio- economic conditions of the project area;

- identify gaps in existing information on the project area and thereby orient the exploratory survey;
- define preliminary target groups or recommendation domains;
- formulate hypothesies regarding the existing demand for innovations;
- and objectively select survey areas, appropriate villages and representative farmers.

The analysis will usually focus more on data **related to external (natural and socio-economic) circumstances**, whereas gathering information on farming systems falls more in the realm of field work.

Various **sources of information** may be tapped, such as maps, rainfall records, reports from government services, research stations, development projects, universities or NGO's. Written documents may be supplemented by verbal information. It should be kept in mind by the survey team, that the aim is not to collect, but to utilize information. It wise to carefully consider which information is worth analyzing at this stage of the research. A lot of information may be interesting but only some may be really useful. Information not required now can be filedand kept for later use.

The analysis of background information forms the basis for selecting representative survey areas or villages. The preliminary target group definition plays a key role in this respect. This may result in the exploratory survey concentrating on specific zones of the project area if available background data suggest a high heterogeneity of farmers' circumstances or farming systems and if the project area is to big too be covered all at once.

4.2.1.6 Field work

Field work is planned based on the the analysis of background data and considers in particular the information gaps identified.

In the following chapter some key issues with regard to survey methods and procedures, survey content and survey organization will be presented. Important aspects concerning communication and cooperation with farmers, which are also important in this respect, are dealt with in Chapter 6: "Some tips for communication with target groups".

Survey methods

Field work combines field observations and interviews.

Field observations are used to supplement and validate base data collected and information gathered in interviews. They may reveal discrepancies between social norms and actual situation. They are also useful in providing information concerning natural conditions, crops and cropping patterns, types of livestock and husbandry, marketing facilities etc. Soil samples for analysis may be taken, if there is no appropriate data base on physical and chemical soil properties available.

Field observations are combined with **individual interviews** in farmers' fields. This way, information on aspects such as cropping patterns and cultivation techniques (and their relationship to natural conditions) can be obtained and compared with information received from farmers immediately. Simple recording techniques are shown in. Also the time required for driving to the village or walking from field to field is productively spent if it is utilized for observations.

Interviews are the key element of the exploratory survey. Different types of interviews are used for different purposes:

Group interviews with the village community or parts of it are useful in getting a general description of farming systems, farmers' practices and system constraints perceived by farmers in the initial phase of the survey. They are also valuable at the end of the survey for discussing issues which are controversial or questions to which farmers responded differently in the individual interviews . "Discussion and dissent within a group can be especially fruitful in helping researchers to understand which criteria are held in common among farmers and which may reflect individual farmers different objectives or available resources" (Ashby, 1990). Group interviews are not appropriate for socially sensitive issues (like income or food availability) and may produce misleading impressions if they are dominated by individuals.

Interviews with individual farmers can provide in-depth information on farming systems, system components, agricultural practices and how these are determined by farmers goals and priorities as well as by external circumstances. If farmers are carefully selected, the interviews will allow some assessment of the diversity within the village community. In the absence of other farmers it is easier to discuss socially sensitive issues. If the interview is done in the field it can be combined with direct observations to validate the farmers' answers with regard to cropping patterns or practices applied. This is an important aspect because farmers have a strong tendency to present what they believe to be the view of the researcher.

Key informant interviews are done with individuals "who have a specialized knowledge of some aspects of local farmers' circumstances" (CIMMYT, 1980). They are particularly useful in gathering in-depth information concerning socio-economic circumstances. Depending on the information required, agricultural extension agents, government officials, staff members of NGO's, input suppliers, buyers of agricultural produce, shopkeepers or merchants, credit agents, etc. may be interviewed. Local leaders, especially knowledgeable and older farmers may be interviewed at the beginning of the survey to gain an overview of agriculture in the target area or to investigate changing farming systems and their causes. A considerable amount of information can be obtained with this kind of interview. Care should be taken, however, that official views are not regarded as proven fact.

Survey procedures

It is useful to reserve the first days of the survey for a **tour of the target area** and for group and key informant interviews to gain an impression of the natural conditions and an overview of agriculture in the area.

The research team's style of approach will determine the success of the survey. Some points that will help to create a relaxed atmosphere are summarized in Table 4.3.

In an informal survey the **interviews are unstructured, informal open conversations with emphasis on dialogue**. Questionnaires are not used. The use of an interview guideline to be prepared before the survey is, however, recommended to make sure that all relevant aspects are covered.

The **recording of information** during interviews is a controversial issue. It is often reported that farmers feel uneasy if notes are taken during the interview. The atmosphere is certainly more relaxed, if no records are taken. In this case the survey team will have to record the information gained soon after the interview. Some researchers think, however, they would miss important points if notes are not taken. The team should abstain from taking notes in any case until the situation seems to be relaxed. Before taking notes the farmer should be asked for his permission. The conversation will be least affected if only one team member takes notes, whereas the others concentrate on the dialogue.

The **duration of an individual interview** should, as a rule of thumb, not exceed 45 minutes unless the farmer is in a talkative mood. Group

interviews may take a little longer. The interview should be terminated if there are signs that the farmer has lost interest or is becoming unwilling. The time will usually not be sufficient to cover the interview guideline completely. There are two ways of solving this dilemma: (a) the initial interviews cover broad aspects of the farming systems. Subsequently researchers focus on priority problems, potential solutions and interactions of these with other aspects of the farming system (FSSP, 1986). (b) the interview guideline is divided into different sections. Only one section of the guideline is discussed with every farmer (CIMMYT, 1985)

The informal survey is a **dynamic data collection** process. At the end of each day a **daily roundup team session** is held to evaluate the data collected, to complete notes where necessary, to check the initial hypotheses on production constraints and underutilized potentials and to reformulate the interview guideline in view of information gaps noticed. As the survey proceeds the focus becomes narrower and sharper.

Though the exploratory interview is considered to be **methodologically simple,** it is **physically tough** (CIMMYT, 1985). Depending on the distances to be travelled not more than 2-3 interviews per day and interview team should be aimed for. A survey duration of approximately 2 weeks appears to be the maximum. A short break for regeneration after half the time scheduled has proved useful.

Selecting of villages and farmers

The choice of **survey villages** is based on the analysis of background information. If the background information suggests a relatively **homogeneous** project or target area, an initial selection of 3-5 representative villages will be sufficient. Further villages may be chosen, if the survey reveals heterogeneity of natural or socio-economic circumstances. If distinct agro-ecological zones (or recommendation domains) were already identified in the analysis of background information, at least 2-3 villages per zone should be included in the survey. The villages should not be situated for convenience, on a tarmac road, as such villages are often atypical (Chambers, 1980). On the other hand they should not be too remote. Relatively easy access is advantageous, in particular if researchers are considering including survey villages in the trial programme later on.

Farmers can be either selected in advance or ad hoc in the field during the survey.

Table 4.3: Some points on how to create a relaxed atmosphere in the exploratory survey

- The research team should show consideration for local customs;
- in many societies it is appropriate to greet village leaders first before farmers are contacted;
- the initial contact with farmers should be utilized to introduce the survey team and to carefully explain survey objectives and procedures, how farmers were selected and which benefits farmers can expect or not expect;
- nothing should be promised which the team cannot deliver;
- the farmer is the expert on local farming systems and should be treated with due respect. The researcher is the layman who listens to and learns from the farmer;
- a location should be chosen for the interview where the farmer feels at ease. In case of the group interview this may be the tree in the center of the village where farmers usually meet or the compound of an individual farmer but not an extension center or a government office. Individual farmer interviews are most appropriately held in the field, where they can be combined with field observations;
- the right timing will influence farmers willingness to participate. Individual interviews in the field may be carried out in the morning, when the farmers are in the fields anyway. It is better to conduct a group discussions in the afternoon after farmers have returned from their field work to the village;
- in any case, it is important to ask farmers beforehand whether they have time for the interview;
- large interview teams will make farmers uneasy. Interview teams should therefore not be larger than 2-3 people;
- interviews are always conducted in the local language. If translators are required they should preferably not be from the survey village or otherwise known to the farmers, because this may bias the answers given.

A **selection in advance** has the advantage that farmers can be briefed about the survey and its objectives in head of time. An informed farmer is usually more accessible and less apprehensive than a farmer taken by surprise. Farmers can be selected using random sampling procedures, if complete lists of farmers (or farm families) are available for the survey villages. Where this is not the case, key informants can be asked for assistance or a village meeting can conducted in advance to select farmers.

For logistical reasons it may not always be possible to select farmers in advance. In this case an ad hoc selection can be done either at a village meeting on the first day of the survey, or farmers met working in the field are chosen randomly.

Care should be taken that a cross section of farmers is involved in the survey, such as:

- male and female farmers (both as members and heads of household);
- farmers with different interests (e.g. crops versus livestock, one crop versus another, etc);
- "traditional" and "innovative" farmers;
- subsistence and commercially oriented farmers;
- full-time farmers and farmers with off-farm employment;
- farmers working in different agro-ecological zones.

It is hardly possible to give a recommendation with regard to the appropriate **number of farmers to be surveyed per village**. Depending, among other points, on the heterogeneity of farms, the time available and the depth of information desired, a range of 3 – 10 is admissible. The higher the number of farmers interviewed, the more detailed the information obtained will be. As it will be impossible to completely understand complex farming systems and farmers' decision criteria, researchers should be satisfied with gaining a good impression and not spend too much time in one place. A village should be left when the survey team has the impression that only little additional information is acquired with every additional interview.

4.2.1.7 Survey synthesis

Eventually the information obtained will be synthesized and compared with researchers' hypotheses with regard to the demand for innovation, groups of farmers that have a particular demand and ways of satisfying these demand. The hypotheses are used as a basis for dialogue on innovation before an

experimental programme is planned. The following analytical steps can be applied in order to achieve the synthesis of survey information:

- **the analysis of demand for innovation**, as it is determined by identified problems and potentials (→ **6.1.4**);
- **the definition of "target groups"** or "recommendation domains", i.e. groups of farmers which have a specific demand for innovation or which are likely to adopt a particular innovation (→ **6.1.3**);
- **the prioritizing of identified problems and potentials**, and
- **the identification of options to satisfy the demand (→ 6.1.5).**

The required analytical steps can be applied, for example, also on information obtained in a dialogue on innovation. They are, therefore, not described here, but in Chapter 6.1: "Analysis of information from non-standardized data collection".

4.2.1.8 Evaluating the diagnosis with farmers

The diagnosis described so far has included farmers mainly as resource persons. The identification of problems and potential solutions is, therefore, based more on researchers perception than on farmers' views. An active participation of farmers in particular in the identification and prioritizing of problems and potential solutions would be desirable in order to ensure that subsequent experimentation programmes are closely directed at farmers' needs.

Two possibilities for encouraging a desired participation are

(1) to do the "farming systems synthesis together with those farmers participating in the survey soon after the interviews are finished and to streamline the results achieved afterwards with the research team, or

(2) to do the "farming systems synthesis" with the research team. The identified problems and underexploited potentials are presented to farmers without showing the researchers' priority ratings. Farmers are first invited to add problems and potentials as well as potential options overlooked by the researchers. Thereafter they prioritize problems and potentials and screen possible options.

The choice of approach will largely depend on the **communicational skills** of the members of the research team. The first approach has the advantage that it is more open to farmers' own views. It is, however, highly

demanding with regard to the communicational skills of the researchers. A danger of the second approach is that farmers may be influenced by the views of the researchers. Nevertheless, this approach appears to be advantageous, if the communicational skills of the research team are rather limited.

An appropriate forum for this activity are group or panel discussions in the villages included in the survey or likely to be included in subsequent experimentation programmes.

4.2.1.9 Organizational aspects

Farming systems and practices are determined by a complex of many different circumstances, as discussed in Chapter 2.
Farming systems diagnosis requires, therefore, an **interdisciplinary approach** in order to analyze farming systems and systems constraints in the light of the different determining factors.

The **core team** responsible for the whole farming systems diagnosis should be composed at least of an **agronomist** (viewing farming systems as determined by natural circumstances), an **economist or/and sociologist** (analyzing farming systems as determined by socio-economic circumstances) and an **extension** worker with knowledge of the target area. Sufficient professional experience of the core team is desirable. At least one member of the core team should also have survey experience and guide the other participants during the survey – "there is no substitute for experience – it is an art" (CIMMYT, 1990).

The **role of women** deserves particular attention. Women play a dominant role in agriculture in many developing countries. Interviews of women by male researchers will, however, be uneasy or socially not acceptable in many societies. It is, therefore, essential that the survey team also includes **female members**.

Depending on specific problems or underutilized opportunities expected in the target area, the survey team can be supplemented occasionally by **specialists** (like soil scientists, plant pathologists, breeders, livestock specialists etc) from research institutes or other relevant organizations.

The assistance of other organizations is in any case necessary if a project does not dispose of the required staff for the core team or if the project staff does not have sufficient field experience. The **participation of "outsiders"** can be valuable also for the identification constraints and opportunities which may be overlooked by "insiders" too familiar with the local situation.

As the exploratory survey will combine interviews and field observations, the most appropriate **time during the year** to do the diagnostic work will be during the **growing season**, preferably one or two months before the harvest when most crops are fully developed.

As a rough guideline, a **time schedule** for the diagnostic phase is proposed in Table 4.4. The time required for the collection of background information is difficult to estimate. It depends on the availability of information required, the sources to be tapped, the travelling involved etc. For field work, survey synthesis and farmer evaluation of the survey the time required depends, apart from factors like size and heterogeneity of the survey area, to a considerable extent on the intensity of the work. A realistic range will be between three weeks (for a relatively shallow survey as preparation for a more intensive "dialogue on innovation") and six weeks (for an intensive survey), if the survey is implemented as a full-time activity of the participants.

Table 4.4: Estimation of time requirements for the different activities of the initial diagnosis

Activity	Time requirement
Collection of background information	**?**
Analysis of background information and formulation of survey hypotheses	**3 – 5 days**
Field work	**5 – 10 days**
Survey synthesis	**2 – 3 days**
Evaluation of diagnosis with farmers	**2 – 5 days**
Writing survey report	**2 – 5 days**

4.2.2 Dialogue on innovation

The term "dialogue on innovation" covers all informal communication between researchers and farmers in the course of the on-farm research process. It is a flexible instrument for achieving the participation of farmers in planning and assessing programmes, or simply for obtaining farmers' views on a specific research subject.

The dialogue on innovation can take the form of panel or group discussions or of talks with individual farmers. It is most efficient when based on or done in front of practical examples or cases.

4.2.2.1 Application and output

The dialogue on innovation is applied in all stages of the research process which call for the participation of farmers:

- it is most commonly applied **to gain the farmers' assessment of innovations** in the course of experimentation. Farmers familiar with the alternatives tested in the experiment will discuss and compare their suitability. The information gained will help researchers asses to what extent a technology corresponds with farmers' goals and preferences.
- The dialogue on innovation is useful in the **identification of alternative options**
- (a) to develop a list of criteria or conditions for screening potential alternatives according to needs from the farmers' point of view the ex-ante screening of potential alternatives or
  (b) to identify potential innovations from a set of available alternatives.
- In the **exploration of demand** the dialogue on innovation can be used

  (a) to work out an inventory and to prioritize demand for innovations, or
  (b) to validate the hypotheses of researchers in respect to the demand for innovations (formulated possibly on the basis of the exploratory survey).
- It can **substitute the exploratory survey completely** where the availability of information about farming systems and determining circumstances is considered sufficient already.

4.2.2.2 Characteristics

The term "dialogue on innovation" is introduced to describe the role played by farmers in this stage of the process as distinguished from the role they play in survey research. Farmers are the active and equal partners of researchers in the dialogue on innovation, whereas they have the more passive role of informant in a survey.

The **basic element** of the dialogue on innovation is an open and unstructured **dialogue** between farmers and researchers. Though a list of topics prepared by the researchers will be useful, the dialogue should move in any direction determined by participating farmers.

The **subject** of the dialogue is the **assessment of or the demand for innovation**.

Discussion **on the basis of concrete cases or practical examples** is more promising than talk on theoretical or abstract topics.

The dialogue on innovation uses **non-standardized data collection methods** like the group discussion, the panel or the non-standardized interview with individuals. It is, therefore, of **an exploratory nature**. It is an excellent means to getting to know farmers' views, but it is not suitable proving their validity as it does not allow quantification.

The open character of the dialogue requires the participation of a person with a **comprehensive knowledge** of the subject to be discussed and **effective dialogue skills** on the side of the research team. This is usally the responsible researcher himself. Field-level personnel are often not qualified for this task.

4.2.2.3 Creating a basis for dialogue

A dialogue on the basis of concrete cases and practical examples will be more fruitful than theoretical discussions. Before the actual dialogue starts it is therefore necessary to **identify** or to **create** cases or examples.

In the following, some possible approaches for the dialogue on innovation will be discussed:

(a) **Group tours** through relevant villages are an effective basis for the **exploration of demand**. Villages should be chosen in which particular problems or potentials can be easily identified.

The group should be made up of farmers from the chosen village, a few researchers and extension workers and interested farmers from other villages. The latter is important because farmers from outside are in a better position to identify existing problems and potentials.

Walking through the fields provides the chance to talk about the role agriculture plays in the life of the village and about crops, cropping systems and production methods. Farmers can exchange views concerning the needs, problems and potentials which determine the demand for innovation.

The talks of the tour are summarizes in a round up meeting at a convenient place in the village (e.g. under a shade tree). An important topic for the discussion is the question how farmers from outside assess the relevance of the observed problems and potentials with regard to their own situation.

The analytical tools described in Chapter 6.1.1 to 6.1.4 can be used to structure the discussion and to summarize farmers views.

(b) **Visits to already existing experimental sites, research stations** or **fields of innovative farmers** are means of **identifiying options** to satisfy the demand for innovation.

The researchers identify appropriate sites in the vicinity of the project area where options to satisfy demand for innovation are being tested or applied already. Groups of farmers are invited to visit the sites jointly with the researchers. The discussions on the site of the experiments focus on:

- the criteria an innovation will have to satisfy in the view of farmers and
- the identification of options for on-farm testing according to the defined criteria.

The analytical tools described in chapter 6.1.5 can be used for this purpose.

The most appropriate choice of farmers for this activity would be the potential participants in subsequent on-farm experimentation. This way they already get familiar with the potential innovations and researchers are more likely to enlist farmers who are really interested in experimenting.

If an experimental site or research station is not available, it is better to create a broad choice of examples for the dialogue on innovation in "exploratory trials" instead of going straight into intensive testing of a limited number of options. This decreases the likelihood that options which farmers may consider appropriate will have already been dropped in an early phase of the research.

(c) The best basis for the **assessment of potential innovations** is the **actual on-farm experiment**. **Dialogue with individual farmers** who participated in the experiment allows individual opinion to be quantified (see Chapter 6.2.2.3 for analytical tools). Quantification is, however, only useful if a representative choice of farmers participated in the experiment – which may not be the case in some phases of the experimentation (see Chapter 5.3.1). Furthermore an in-depth assessment with individual farmers requires considerable time and funds.

A better approach for exploratory purposes is the **dialogue with farmer groups** on **field days** and **field tours**. One discussion with a farmer group will usually yield more information than several talks with individual farmers. Group discussions also involve farmers who did not participate in the experimentation programme. They are, therefore, a good means of disseminating information and interesting new farmers in the next phase of experimentation. Field tours with farmers groups can assess a number of experiments in the same day. They are very time and cost efficient if several experiments are conducted simultaneously in the same village (see "representative village approach", Chapter 5.3.1).

4.2.2.4 Choosing appropriate farmers

For a village tour it is quite feasible to simply invite all interested farmers of the village to join in. Sometimes it is also possible to involve farmer groups which already exist for a different purpose. In general, however, a more fruitful dialogue is achieved with farmers specifically selected for this purpose. It is less important that farmers are chosen on the basis of being represantative than that they show:

- willingness with few inhibitions to communicate with researchers;
- ability to express their thoughts;
- experience with the topic to be discussed (every community has specialists for specific topics);
- keen interest in innovation.

In order to make a good choice of farmers according to these criteria, it is necessary to get to know farmers relatively well or to enlist the help of key informants who know farmers well. Village meetings or village tours are one way of becoming acquainted with farmers in the initial phase of the research. Village leaders or local extension workers can be key informants.

The "panel method" (s. 4.2.1.3) -in particular with panel groups- is very useful for the purpose of dialogue on innovation. The advantage of including farmers in the repeated dialogue throughout the research process is that:

- farmers become familiar with the general research concept and the particular topic;
- farmers get sufficient time to think about all relevant aspects of the topic and to develop individual opinions;

- there is a good chance of developing a relationship of mutual confidence between farmers and researchers.

(Refer to Chapter 6.1 for analytical methods that can be applied in the dialogue on innovation).

4.2.3 Formal survey

The formal survey is used for confirmatory purposes. It is applied to **verify** and **quantify** information or to **test hypotheses** formulated on the basis of information obtained through exploratory data collection methods (like the exploratory survey or the dialogue on innovation). Its basic element is the **standardized interview** which is applied on a **representative sample** of the target population.

4.2.3.1 Application and output

Formal survey techniques can be applied for many different purposes. In the context of this book they are useful at two stages of the research process:

- in particular in the final **assessment of an innovation,** to examine the degree of adoption and the nature of modifications applied by farmers who were exposed to the innovation in trials specifically designed for this purpose;
- to some extent also in the **exploration of demand**

  (a) to quantify information obtained in the exploratory survey (for example to set a baseline for adoption surveys to be executed in the course of the research);

  (b) to test a hypothesis which determines the direction of the subsequent research, if the validity of the hypothesis is uncertain.

4.2.3.2 Characteristics of the formal survey

In the formal survey a **uniform set of data** is collected from a relatively large number of farmers which, as a whole, are **representative** of the respective target group or area in order to achieve **quantification, reproducibility** and **comparability** of results.

The basic survey method is the **standardized interview** using a **fixed questionnaire,** which determines **the order and formulation of questions** to be asked. It may be combined with field observations in order to verify the answers obtained.

The use of a **fixed questionnaire limits the range of topics** that can be addressed and the **depth of the information** obtained. The formal survey cannot be as broad as the exploratory survey. The essential points should be decided before the questionnaire is designed. The formal survey can therfore be **effectively applied only if the necessary background information is already available** from other data sources (e.g. an exploratory survey or the dialogue on innovation).

An important advantage of the formal interview is that it does not need to be implemented by highly qualified staff. The application of the **standardized interview** procedure requires **enumerators** with a sound training on survey techniques, although they do not need a profound understanding of the research object and concept.

4.2.3.3 Survey process and procedures

Questionnaire design

The **contents** of the survey is guided by the purpose as well as by the information available already. In view of the limited range of topics that can be covered, sufficient background information is required in order to formulate the questionnaire efficiently.

The **length of the questionnaire** is determined by the concentration span of both interviewee and interviewer. Recommendations in the literature with regard to the maximum duration of an interview vary between 1 and 2 hours. The average duration should not exceed 1 hour - the shorter the interview, the better the response.

There are two different **types of questions** : the **open response** and the **closed response** question. The open response question leaves the answer entirely to the interviewee. The closed response question offers mulitiple choice answers. The advantage of the open response question is that it does not guide the interviewee. He is free to express his own opinion, whatever it may be. An serious disadvantage is that a wealth of different answers is difficult to categorize and code in the survey analysis. The prescribed answers to a closed response question facilitate an easy ana-

lysis. There is the danger, however, that the interviewee may respond negatively or inaccurately, because none of the suggested answers exactly describe his own opinion.

A compromise between the two types of questions is the **open response question with precoded answers**. In this case the interviewee is asked an open response question, but the questionnaire contains a number of likely answers, formulated on the basis of experience from the exploratory survey or the dialogue on innovation. The precoded answers should include "others" to take care of unexpected answers. The interviewer just chooses and marks the appropriate answer or specifies more fully if an answer falls under "others".

Table 4.5: Some tips on the formulation of questions

Use clear and simple language, avoid specialist terms, abstract expressions and abbreviations.
Avoid **normative expressions** or **suggestive questions** which will provoke a specific answer.
Avoid words and phrases which are **not exact** (like "general", "typical", "usual", "average", "often" etc). Vague questions will yield vague answers.
Keep questions short (not more than 15 words).
Solicit answers which do not comply with prevailing opinion or conventional rules (like extension recommendations) by indicating in the question that such practicies may be very common, well justified and not at all reprehensible.
Clearly define **location, time and context** on which the interviewee is supposed to base his answer.
Give **written explanations** where question may be difficult to understand. At the beginning of each section of the questionnaire there should always be a sentence or two to explain the new topic.
Write questions in the **local language** of the survey area. Where a translation of the questionnaire is necessary, it should be done by somebody who has an expert knowledge of the local language and is conversant with the concept and contents of the survey as well.

The **construction of the questionnaire** has a considerable influence on the **flow of the interview**. The following tips will help to achieve a pleasant flow of the interview:

- Questions belonging to the same topic are grouped in the same section of the questionnaire;
- questions should follow smoothly and logically from one to the next;
- possible logical sequences might be: a time sequence starting with the past, ending with the future; or moving from topics more familiar to the interviewee to less familiar ones, or from the more important to the less important ones;
- sensitive questions which may possibly influence the course of the interview should be asked at the end of the questionnaire or, if this is not possible, at the end of every section;
- each topic starts with general questions before going into specific ones. On the same line, open response questions are better asked before closed response ones;
- the whole questionnaire or some of the topics may not be relevant for all interviewees (for example questions on a specific crop). A "filter question" at the beginning of the questionnaire and of every new topic ("do you grow xy-crop, yes or no?") helps avoid answering a multitude of questions with "not applicable".

Bearing the subsequent **survey analysis** in mind at this stage helps to speed up data processing later. Categorizing unnecessary data often wastes a lot of time and effort. Where computer facilities are used, it should be possible to enter the information straight from the questionnaire – without data transformation. Where a **coding** of answers is not carried out correctly by the enumerators (which will often exceed their capability), facilities for ex post coding should be included in the questionnaire.

Pre-test

A **pre-test** of the questionnaire tests its applicability. It may result in the reformulation of individual questions or the revision of the entire questionnaire. The pre-test examines whether

- questions are easily understood by the interviewees;
- questions are correctly interpreted by the interviewees;
- the planned time limit is not exceeded;
- the questionnaire design facilitates a problem-free processing of the survey data.

The pre-test is preferably carried out by the enumerators after training with a specific selection of interviewees. Some 2-3 interviews per enumerator will usually suffice. The participation of the survey designers is desired, so that they are able to get an impression themselves of the existing problems with the questionnaire and of the performance of the enumerators.

Enumerator selection

In contrast to the exploratory survey, the formal survey does not need to be conducted by the researchers themselves. The standardization of order and formulation of questions allows "enumerators" to implement the survey. These can be either junior staff of the programme or people specifically selected for the purpose(for example, farmers' sons with sufficient education). An enumerator should have:

- a basic school education in order to ensure that the questionnaire is filled out correctly;
- an excellent knowledge of the local language for fluent communication with farmers;
- a reasonable knowledge of local conditions and agriculture to be able to judge the validity of the answers obtained;
- the respect for farmers required in order to create an appropriate interview atmosphere;
- the motivation to work hard an honestly.

Some of these points can be assessed already during the recruitment interview, others during training and questionnaire pre-test. It is preferable to eliminate enumerators during enumerator selection rather than during training, the pre-test or the survey.

The **number of enumerators** required depends on the planned duration of the survey as well as on the number of farmers to be interviewed. Considering the time for travelling, locating farmers, some courtesy talk and the actual interview considering also the fact that a good interview requires a fresh mind an interviewer will not be able to conduct more than two or (in rare cases) three interviews of one hour a day.

Enumerator training

Adequate enumerator training is a precondition for the success of a survey, in particular where enumerators are "laymen" in this field of work. Even with the most well-designed questionaire, a survey is bound to fail if the enumerators do not understand the survey objectives, have inappropriate attitudes or record data incorrectly. This applies to even a small survey, for example one examining adoption of trial innovations by farmers who participated in an experimentation programme. Training instructions should include:

- an explanation of survey objectives, concept and contents;
- an explanation of the questionnaire (all questions, explanations given in the questionnaire, the use of filter questions, etc);
- an explanation on how to record the answers;
- a description on how to contact interviewees;
- exercises on how to introduce the survey to the interviewee;
- basic rules of conduct during the interview;
- a description and tour of the survey area, if the enumerators are not familiar with it.

The training will be more effective if it includes not only theory, but practical interview exercises (either role-plays within the training group or with selected interviewees – possibly combined with the questionnaire pre-test).

The effectiveness of a large-scale survey can be greatly improved if an interviewer's manual is made available to the enumerators as a basis for training and as a reference guide for field work.

Sampling interviewees

The survey may not be relevant to all areas of the project or to all farmers within a specific area. The first considerations with regard to the choice of interviewees are therefore:

- which specific group of farmers is of interest to the survey;
- how is it possible to choose only members of the target population for the survey.

The answer to these questions is simple in the case of a survey which examines the adoption of trial innovations by farmers who previously participated in an experimentation programme. Here it is usually possible to include the total target population (i.e. all previous participants) in the survey.

Generally it is not possible to include the entire target population in a formal survey for the exploration of demand. In this case it will be necessary to interview part of the defined target population and to draw conclusions regarding the entire target population based on the sample. This requires the use of **proper sampling procedures**.

Using a random sampling procedure ensures that each subpopulation of the target population has an equal chance of being selected.

For **simple random sampling** every member of the target population is listed and a random selection of interviewees is made. The disadvantage of this simple method is the extreme difficulty in obtaining a complete list of farmers in a particular area.

Two-stage sampling therefore appears to be the more appropriate method. In this method a random sample is drawn from a list of administrative units or villages in the target area. In a second stage a random sample is selected from a list of farmers in each administrative unit or village sampled. In the absence of a farmer list, a rough map of houses in a village is drawn, the houses are numbered and the numbers randomly sampled.

The **sample size** should be large enough to be representative of all farmers in an area. Statistical rules for determining the sample size on the basis of the variability within the target population are hardly applicable for this type of survey. Proposed sample sizes for a defined target population vary between 30 and 50 farmers (CIMMYT, 1980; FAO, 1990). A larger sample size will be required, if a high heterogeneity of farmers is expected.

In order to find substitutes for farmers who were selected but could not be interviewed (because they were erroneously included in the selection list, were not relevant to the purpose of the survey, refused to participate or could not be found) a **reserve sample** (about 25 % of the original sample) is drawn up. The selection follows the same procedure as the original sampling (simple random or sampling by administrative unit/village).

Survey implementation

The **first contact** between interviewer and farmer strongly influences the success of an interview. Some hints on how to get in touch with farmers and how to gain their cooperation are given in Chapter 6.

The **timing of a survey** is also important in gaining the cooperation of farmers. A relatively slack period in the agricultural calendar is preferable. On the other hand, survey results will be better if the topics to be investigated are still fresh in farmers' memories. A **visit in advance** to agree on a day and time for the interview will ensure that farmers are available and have sufficient time on the agreed day.

Farmers not met at home should not just be replaced by a farmer from the reserve list. It may be that some of them belong to a specific group of people and are not at home for a good reason (for example off-farm work or employment). Wherever possible **return visits** should be tried on different days of the week or hours of the day.

The interview should be conducted in an **informal and relaxed atmosphere** at a place convenient to the farmer. An appropriate place for an interview concerning a specific crop would be the field where this crop is grown.

Relevant answers are obtained if the **primary decision maker** for the particular farm activity is interviewed, and not just the household head. Preferably only the interviewer and interviewee should be present. Answers are less influenced by considerations regarding **social desirability** in the absence of an audience.

Effective **supervision** is particularly necessary at the beginning of a survey. Such supervision is best carried out by the researcher who will be responsible for the data processing later on. A **daily editing** of questionnaires in the presence of the interviewer helps to improve enumerator skills in the course of the survey and minimizes data processing problems. The daily check should include aspects such as legibility and comprehensibility of answers as well as consistency and completeness of the questionnaire.

In the early phase of a survey it is also a good idea to **spot check** in the field whether the interviews are conducted according to the planned schedule. Some check questions can be (informally) incorporated into the talk with the farmers visited in order to verify whether the interviews are recorded correctly. As the survey proceeds, the level of supervision can be relaxed.

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Annex

Annex 4.1: Checklist for information about farming systems (adapted from Mutsaers et al. 1986)

1 Farmer circumstances

1.1 Physical/infrastructural circumstances
Maps, administrative divisions, physical infrastructure and accessibility, educational and health facilities...

1.2 Socio – economic circumstances
Institutional
Marketing and distribution mechanism,
intervention structures (extension and credit programmes..),
farmer organizations ...
Economic
Population density and growth rate, settlement pattern,
off farm / non farm income opportunities and rel. importance,
land, labour and capital availability and sources,
crop statistics, marketed products, purchased inputs,
availability and demand for food, shortage periods availability of and demand for inputs/products price fluctuations, rel. prices for agric. products,
retail markets.
Social and cultural
Beliefs and attitudes, social obligations,
production goals, food preferences,
land tenure systems, ownership of and responsibility for crops/livestock, labour division by gender...
role of women.

1.3 Natural circumstances
Climate
Evapotranspiration, rainfall regime, median and quartiles of rainfall, critical periods, temperature, humidity.
Vegetation
Forest, bush or grassland, characteristic plant species.

Annex 4.1: Checklist for information about farming systems (adapted from Mutsaers et al. 1986)

Land, soil and water
Land form, land types and associated soils with frequency of occurrence, texture and colour of top soil, soil depth, hard-pans, water table heights, water storage capacity, chemical fertility, occurence of soil erosion.

2 Farming Systems

2.1 Crops
Cropping patterns and land use
Crops, cropping patterns and crop associations,
utilization of different land types,
farm and field sizes,
products collected from the bush.
Cultural practices
Land preparation, planting, crop densities, weeding, manuring, soil fertility management, harvesting, cropping calendars.
Inputs and Yields
Crop varieties (desired and actual characteristics),
extend of inputs used (seeds, fertilizers, chemicals),
crop yields achieved.
Crop disorders
Pests, diseases, weeds and their control, nutrient deficiencies.
Post harvest aspects
Storage, processing, consumption, marketing,
food availability calendar.

Annex 4.1: Checklist for information about farming systems (adapted from Mutsaers et al. 1986)

2.2 Livestock
Types and breeds of farm animals,
ownership, quantities of livestock kept, herd composition, herd management,
husbandry practices, housing, equipment used,
feeding, types of feeds, seasonal availability,
watering / water availability,
diseases and disease control practices,
utilization and seasonal availability of animal products,
disposal or marketing of animal products, market demand,
utilization of draught power,
use, handling and storage of livestock manure.

2.3 Trees on the farm
Type, location and number,
use of tree products, economic value,
effects on crops, soil fertility effects,
fuelwood situation.

3 Synthesis
Agroecological zones,
zones with similar socioecon. conditions ,
definition of target groups,
farming systems, system trends and determining factors,
external factors affecting agric. production,
resources limiting agric. production,
management strategies applied to cope with limitations,
system constraints and underexploited opportunities.

Chapter 5 Experimentation